

*Madras Observatory*  
**ASTRONOMICAL OBSERVATIONS,**

MADE IN THE  
**V O Y A G E S**

Which were Undertaken

By ORDER of His PRESENT MAJESTY,  
FOR MAKING

**Discoveries in the Southern Hemisphere,**

And successively performed by

COMMODORE BYRON, || CAPTAIN CARTERET,  
CAPTAIN WALLIS, || AND CAPTAIN COOK,

IN THE

**DOLPHIN, TAMEER, SWALLOW, AND ENDEAVOUR.**

Drawn up and published by ORDER of the

**COMMISSIONERS OF LONGITUDE.**

From the JOURNALS which were kept by the several COMMANDERS, And from the PAPERS of  
Mr. CHARLES GREEN, formerly Assistant at the ROYAL OBSERVATORY.

By **WILLIAM WALKER, F.R.S.**

Master of the ROYAL MATHEMATICAL SCHOOL, in CHRIST'S HOSPITAL.

Illustrated with MAPS of NEW ZEALAND and the Eastern Coast of NEW HOLLAND,  
from the original DRAWINGS by Captain COOK.

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M. DCC. LXXXVIII.

# E R R A T A.

Page 24. line 12 and 13, for ship's lat.  $49^{\circ} 43'$  *read*  $49^{\circ} 23'$ .

47. The bearing of Three King's Isle, which is put down on the 25th, ought to stand against the 24th of December

50. March the 9th, in the bearing of the South Cape, for N.  $72^{\circ}$ . W. *read* N. W. by W.

In the chart of New Zealand, the mark for March the 11th, at noon, is put on the wrong branch of the track: it should have been put after they had tacked from the land, and were standing southward.

116 Col. 2, for Talaga Bay *read* Tolaga Bay.

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# I N T R O D U C T I O N.

**T**HE Observations which compose the following Work, were made in the course of the voyages which have been recorded by the late Dr. Hawksworth; and the journals and papers which contained them were put into my hands, by order of the Commissioners of Longitude, in April 1778, with directions to prepare them for publication, and to deduce the situations of such lands as were seen in these voyages from them, in the best manner that the observations and other data would admit of. The observations which were made in the Dolphin's second voyage were finished immediately; and I made some progress in those which were made on board the Endeavour: but I soon found that doubts and difficulties multiplied very fast, owing to the imperfect state that Mr. Green's papers were left in at his death, which happened in the course of the voyage; and, therefore, I laid the work aside, at that time, in hopes of having those difficulties removed by Captain Cook, when he returned from the voyage which he was then upon; but which, unfortunately, never happened. When the melancholy news of Captain Cook's death arrived, I was engaged in another work for the Board of Longitude; and after that was completed, bad health, and some avocations which required to be performed immediately, prevented me from resuming this for some time afterwards: and this is the true reason why it has appeared so late.

The lunar observations which were made on board the *Dolphin*, in her second voyage, under the command of Captain Wallis, were all made by Mr. Harrison, the Purser: they were also computed by him; and it is but justice to his merit to say that they have every appearance of being exceeding good ones. It is also much to his credit as an astronomer, that I have found but one error of any importance in all his computations, notwithstanding he had not the advantage of a Nautical Almanac, but had all the places of the sun and moon to compute from the tables. Computing these observations was, at that time, an arduous task in comparison of what it is now! The observations were made with a brass Hadley's Sextant of 18 inches radius, supported on the back with edge bars, and made by the late Mr. Bird. In computing them, the height of the observer's eye has been supposed about 20 feet above the surface of the sea.

The observations which were made on board the *Endeavour* were made chiefly by Mr. Charles Green, who was sent out by the Royal Society to observe the Transit of the planet Venus over the sun, in 1769: but all the observations in this voyage are distinguished by the initial letters of the observer's name. No person, however, except Mr. Green, preserved their observations while he lived, but contented themselves with inserting the results in their journals, or log-books; and whatever observations, appear of any other person's making, have been preserved by him, which renders them, in some measure, doubtful, because it is not certain that he has always had the errors of the quadrants which they were made with. Many instances occur where he expressly says the error of the quadrant was unknown to him; and there is great reason to believe that there have been errors in other instances which he has not known of beside these, because the longitudes of the ship; which have been derived from the observations by me, will not agree with the results



faults which have been put down by the observers themselves. However, as this may have arisen from faults in the computations, I have not thought proper to exclude any observations but such as Mr. Green has expressed some doubts of: where he has, I have uniformly rejected them. After Mr. Green's death, indeed, Mr. Charles Clerke, who undertook to make the lunar observations, preserved them as Mr. Green had done. All the meridional altitudes of the sun's lower limb, which are inserted among the observations, were observed by Mr. Green, without a single exception.

Where I have put down, "Latitude of the Ship observed," without the meridional altitude, I have found it so inserted, in the log-books; and where I have called it the "Latitude by account", the latitude deduced from the dead reckoning is to be understood; no observation having been made that day, on account of the unfavourable state of the atmosphere, or owing to some local impediment; and, in every instance of this kind, Captain Cook has been my authority, if it could be found in his Journal; where it was not, I have taken it from the Master's or the Gunner's log-books; but these instances are too few to merit particular notice.

When the letter U occurs at the end of the numbers which stand in the column of Moon's Altitudes, the Upper limb of the moon was observed; and when the letter L occurs, the moon's Lower limb was observed. In those few instances, where the letter C is found, the apparent altitude of the moon's center has been obtained by Computation: the moon's altitude having been erroneously observed, or not observed at all, on account of some local impediment. One instance alone, must be excepted, in which the moon's center was observed with the astronomical quadrant. The sun's lower limb was always observed.

When

When no latitude is put down in the proper column against the observed distance of the moon from the sun or a star, the apparent time is found from some observed altitude of the sun, either preceding or following it. If it be the distance of the moon from the sun, near noon, the time is found from that altitude of the sun, on the same day, which is farthest from noon; and if it be the distance of the moon from a star, in the night, the time is found from that altitude of the sun which is nearest to it, whether before or after: in both these cases, the longitude put down against the distance, is to be esteemed the longitude of the ship at the instant when the altitudes were taken, which the time is derived from.

In all the lunar observations which were made on Point Venus, the time was derived from equal altitudes of the sun, taken with the Astronomical Quadrant.

In the column intitled, “Long. W. (or E.) of Greenwich,” the longitude of the ship is put down every day at noon. This longitude is taken from Mr. Green’s papers to the time of his death; and afterwards from Mr. Clerke’s. It is what they esteemed to be the true longitude of the ship, at noon; and though it differs something from that which I have inserted in the tables, among “the deductions from the observations,” never deviated far from the truth: and, as it exhibits the opinion of a person who was on the spot, I thought it might be pleasing to some persons, and therefore inserted it. I have certainly done no harm in this, because it only occupies a space which would otherwise be blank. It seemed to me, however, necessary to mention it, because some might otherwise be surpris’d to find two accounts of longitude, which differ from each other.

In the column entitled, "Phænomena and Remarks:" P. signifies that the observation was taken on the poop, where the observer's eye was about 22 feet above the surface of the sea. Q. D. or Q. Deck, is meant to express, that the observation was made on the quarter deck, on which place the observer's eye was about 19 or 20 feet above the surface of the sea. M. D. signifies that the observation was made on the main deck; and F. C. that it was made on the fore-castle, in either of which cases, the height of the observer's eye was about 18 feet above the surface of the sea. The observations were made with a brass Hadley's Sextant, of 15 inches radius, constructed by Mr. Ramsden, with edge bars.

In determining the longitudes of places in the Dolphin's voyage, it does not appear to me, that I could have taken any method but that which I have followed, unless I had suffered them to depend on a single observation; a mode which I conceive few would have thought well of. But in the Endeavour's voyage, where the observations are more numerous, a greater variety of methods might have been pursued. That which I have made use of appears to me to be the best. It is that which I followed in the voyage I made with Captain Cook in the Resolution, and has now been many years before the Public without censure, that I know of. Some may, indeed, think that I ought to have allowed more weight to some observations than to others, or that I should have allowed more weight to those means which are composed of a great number of observations than to those which are composed of fewer. I wish, however, to observe, that it would be very difficult for any person, except the observer himself, to form any judgment with regard to the value of one observation above another; and I have frequently found that he is, himself, very liable to be mistaken in this matter: and that observations which have been most esteemed by him, at the time when they were made, have deviated more from the mean of the whole,

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than

than others which he has thought less of. In respect to allowing more weight to one mean than to another, the method which I have followed will be found to be of no inconvenience to those who think so; because I have laid every mean fairly before him, and the number of observations which each is composed of, as well as the observations themselves, and the circumstances which attended them, as far as they came to my knowledge. He has, therefore, nothing to do but form his own judgment of the matter, and allow what weight he may think proper to each---All the laborious part of the business is done to his hands. But after all, this mode of proceeding appears to me to involve a great deal of fancy and hypothesis, which it was my duty to avoid: I have contrived to leave all the materials, which I have made use of, in such a state that those who are fond of it may form what hypothesis they think proper, and apply them to it without trouble.

The reader is requested to take notice, that the algebraic signs (+ and -) which are annexed to the errors in the tables, do not express the nature of these errors, but the manner in which they are to be applied.

The meteorological journal for the months of May and June, in the year 1769, will afford some idea of the winds, weather, and state of the atmosphere in general, for these two months, at Otaheite; and may be useful in several enquiries. It will certainly afford amusement to some, and takes up but little room.

In constructing the Tables of the Variations of the Compass, which were observed on board the Dolphin, the Swallow, and the Endeavour, I have determined the situation of the ship with all the exactness that circumstances would admit of when each observation was made, because the variations of the compass which have been observed  
in

in these voyages, and the two which followed them, will afford such a basis for founding a theory of these variations on, as no former period can boast of. They exhibit also a phenomenon which no enquirer into this subject ever thought of, and which no theory of the variations that has hitherto been formed will account for. We were acquainted with many places where the variation of the compass is a *maximum*, but none where it arrived at a *minimum* without passing through 0, before these voyages made one known to us in the Pacific Ocean, between the western coast of America and the Society Isles.

Before I conclude this introduction, I shall take the liberty of rectifying a few errors, or misconceptions, which Dr. Hawkworth has slipped into, in his account of these voyages.

Page 68, vol. II. after reciting what the writer of Lord Anson's voyage has said relative to ships running southward as far as the latitude of 61 or 62 degrees, before they attempt to stand westward, round Cape Horn, he makes Captain Cook say, "But I cannot in any case concur in recommending the running into the latitude of 61 or 62 degrees, before any endeavour is made to stand to the westward. We found neither the current nor the storms, which the running so far to the southward, is supposed necessary to avoid; and, indeed, as the winds almost constantly blow from that quarter, it is scarcely possible to pursue the advice." Captain Cook's words are these, "As to running into the latitude of 61 or 62 degrees, before any endeavour is made to get to the westward, it is what I think no man will ever do who can avoid it, because it is not southing but westing that is wanted: this way, however, he cannot steer, because the winds blow almost constantly from that quarter." As this passage stands in the printed account, Captain Cook is made to contradict himself; for he immediately adds, "So that the navigator has no choice left but to stand to the southward, close on  
"a wind:"

“a wind:” but this addition agrees perfectly with what he has written in his journal.

The words which Dr. Hawkworth has put into Captain Cook’s mouth, vol. III. p. 621, concerning the lunar observations, and the theory on which they depend, has been very severely, and very justly censured. It is, therefore, no more than justice to the memory of Captain Cook to produce the very words which he has made use of in his journal on that occasion. He says, “In justice to Mr. Green I must say that he was indefatigable in making and calculating these observations. By his instructions also, several of the petty officers can make and calculate them almost as well as himself. It is only by this means that this method of finding the longitude at sea can be brought into universal practice—A method which we have found may be depended on to within half a degree! which is a degree of accuracy more than sufficient for all nautical purposes. Would sea officers once apply themselves to the making and calculating these observations, they would not find them so difficult as they at first imagine, especially with the assistance of the Nautical Almanac; for by the help of it, the calculations for finding the longitude take up but little more time than that of working an azimuth for finding the variation of the compass: but unless this Ephemeris be published for some time to come, more than either one or two years\*, it can never be of general use in long voyages, and in short ones it is not so much wanted, for without it the calculations are laborious, and discouraging to beginners, and such as are not well versed in this kind of calculations.” Captain Cook’s journal does not contain a word relative to the labours of the speculative theorist” being superseded by the qualifications of sea officers. His knowledge of the subject was at least suf-

\* When Captain Cook failed on his voyage in the Endeavour, the Commissioners of Longitude had not been able to print the Nautical Almanac for many years in advance. It may now always be had five or six years in advance.

to prevent him from falling into such an error; and to inform him of the labours both of the theoretical and practical Astronomer. It may be necessary to keep the tables, which the Ephemeris is computed from, correspondent to the Heavens.

In page 665, it is said, “ We were now well assured, that as *the first* land we had seen was Timor, the last island we had passed was Timor Laut.” They were, at the time Captain Cook was writing, a-breast of Timor, and the Captain’s words are “ As *this* land *is* Timor, the last island we saw must have been Timor Laut.” The first that they saw was supposed by Captain Cook to be the Arro Islands.

In the observations which were made on board the Dolphin, the number of observations which each mean consists of, is expressly mentioned in a column kept for the purpose: but in those observations which were made on board the Endeavour, each mean is composed of three observations, unless it be expressed to the contrary, by means of a figure in a parenthesis (2), where the figure denotes the number of observations which that mean is formed from.

As no observations for determining the longitude of the ship were made in the Dolphin’s first voyage, under the command of Commodore Byron, it was not thought necessary to put any of the journals of that voyage into my hands. But, in making the deductions from the observations which were taken in the other voyages, it occurred to me that Mr. Byron saw many places, the longitudes of which have been well determined in the course of other voyages; and, therefore, that the reckoning, kept on board the Dolphin, might be corrected with sufficient accuracy to render the variations which they observed useful. I therefore mentioned this circumstance to the Board of Longitude, which was held on

the first of this month; and, in consequence, all the journals which could be found, relating to the Dolphin's first voyage, were sent me, and I have collected out of them the variations of the compass which are inserted on the following pages, marked 3\* and 4\*. But it must be observed that no log-books could be found which had been kept by any of the principal officers; and, therefore, it is highly probable, that many observations were made of the variation which I have not been able to meet with: and, indeed, this appears but too plainly; for there are many variations inserted in Dr. Hawke's narrative of this voyage, which will not be found here.

The places which I have made use of for correcting the longitudes in the journals of the Dolphin's first voyage, are the following:

| Places.             | Longitude. | By whom determined.         |
|---------------------|------------|-----------------------------|
| Funchall            | 17 11 W.   | Resolution's first voyage.  |
| Port Praya          | 23 29 W.   | Ditto.                      |
| Rio Janiero         | 43 18 W.   | Endeavour's voyage.         |
| Port Desire         | 67 10 W.   | Dolphin's second voyage.    |
| Cape Virgins        | 68 26 W.   | Ditto.                      |
| Cape Desseada       | 74 18 W.   | Resolution's first voyage.  |
| Maffa-fuero         | 80 22 W.   | Messrs. Juan and Ulloa.     |
| King George's Isles | 145 10 W.  | Resolution's first voyage.  |
| Tinian              | 214 4 W.   | Dolphin's second voyage.    |
| Bathec Isles        | 239 5 W.   | Dolphin's second voyage.    |
| Pulo Wawoor         | 104 40 E.  | Resolution's second voyage. |
| Java Head           | 104 48 E.  | Rev. Mr. Mohr, of Batavia.  |
| Cape of Good Hope   | 18 23 E.   | Messrs. Mason and Dixon.    |
| St. Helena          | 5 49 W.    | Rev. Dr. Maskelyne.         |
| Scilly Lights       | 6 46 W.    | Requisite Tables.           |

From the reckoning, corrected by these means, I have derived the situations of the five following islands, none of which, as far as I can find, except the Isles of Disappointment, have been seen by any naviga-



on : they certainly have none of them been seen  
means of determining their situations than he

| I S L A N D S.               | Latitude. | Longitude. |
|------------------------------|-----------|------------|
|                              | ° ' "     | ° ' "      |
| The Isles of Disappointment. | 14 7 S.   | 141 22 W.  |
| The Isles of Danger,         | 14 58 S.  | 147 48 W.  |
| The Duke of York's Island,   | 10 56 S.  | 165 59 W.  |
| Byron's Island,              | 8 29 S.   | 172 22 W.  |
|                              | 1 13 S.   | 177 8 E.   |

The utmost care has been taken to give these observations with accuracy: Every mean has been taken by two persons, separately, and carefully compared, and corrected, where necessary, by myself. From all those observations which are marked with an asterisk (\*), the longitudes of the ship or place, have been recomputed by two persons, separately, and their computations compared with each other. One of the computers made use of the parallaxic tables, which have been published by order of the Commissioners of Longitude, and the other made use of the method which is given at page 304, vol. II. of the latter editions of Robertson's Navigation. Four minutes in longitude were allowed for the difference which might possibly arise from computing by these two different methods, and the mean of the two results were constantly taken, so that the numbers which are inserted never differ more than two minutes from either computation, and very seldom more than half that quantity. Those observations which are not marked with an asterisk, being made in situations where they were not much wanted, the recomputing of them has been dispensed with. On the whole, I am  
willing

willing to hope that every thing will be found as correct as the nature of these things will admit of. In many figures, and long computations, some errors must be expected; and, if there are not too many of them, will, I hope, be pardoned.

WILLIAM WALES.

*Christ's Hospital,  
March 27, 1788.*





## VARIATIONS OF THE COMPASS.

3

| 1764.    | Latitude of the Ship. North. | Longit. of the Ship. West. | Variation of the Compass. West. | Time when and Means.                               | 1764.     | Latitude of the Ship. South. | Longit. of the Ship. West. | Variation of the Compass. East. | Time when and Means. |
|----------|------------------------------|----------------------------|---------------------------------|--|-----------|------------------------------|----------------------------|---------------------------------|----------------------|
| July 9.  | 38 33                        | 11 47                      | 17 32                           | E. Azim.   | Nov. 15.  | 45 35                        | 66 35                      | 19 34                           | E. Azim.             |
| — 12.    | 32 36                        | 15 55                      | 18 12                           | E. Azim. The Deferters N. 86° W. diff. 10 leagues. | — 19.     | 47 58                        | 67 0                       | 19 0                            | M. Azim.             |
| — 20.    | 31 18                        | 17 18                      | 14 18                           | E. Azim.   | Dec. 5.   | 47 15                        | 65 36                      | 18 34                           | E. Amp.              |
| — 22.    | 31 10                        | 17 20                      | 14 41                           | E. Azim.   | — 6.      | 47 0                         | 62 20                      | 19 17                           | Dicto.               |
| — 24.    | 25 44                        | 19 55                      | 12 34                           | E. Azim.   | — 12.     | 49 2                         | 63 35                      | 18 18                           | E. Azim.             |
| — 25.    | 21 6                         | 20 56                      | 10 48                           | Dicto.   | — 17.     | 50 47                        | 67 30                      | 18 45                           | M. Azim.             |
| Aug. 3.  | 20 4                         | 21 25                      | 10 48                           | M. Azim.   | 1765.     |                              |                            |                                 |                      |
| — 4.     | 14 0                         | 23 42                      | 8 40                            | E. Azim.   | Jan. 29.  | 51 16                        |                            | 23 24                           | E. Azim.             |
| — 7.     | 13 17                        | 23 39                      | 8 10                            | Dicto.   |           |                              |                            |                                 |                      |
| — 10.    | 13 17                        | 23 39                      | 8 2                             | E. Amp.  | April 13. | 51 25                        | 79 25                      | 20 36                           | M. Azim.             |
| — 14.    | 10 1                         | 22 0                       | 8 19                            | E. Azim.   | — 14.     | 50 21                        | 79 30                      | 18 40                           | E. Azim.             |
| — 15.    | 4 38                         | 23 5                       | 6 27                            | Dicto.   | — 15.     | 50 21                        | 79 30                      | 19 24                           | Dicto, Ta.           |
| — 16.    | 4 24                         | 23 41                      | 7 0                             | M. Amp.  | — 16.     | 48 59                        | 79 40                      | 13 30                           | E. Azim, Ta.         |
| — 17.    | 4 23                         | 23 42                      | 7 0                             | M. Azim.   | — 17.     | 48 0                         | 79 36                      | 17 50                           | M. Azim.             |
| — 18.    | 4 7                          | 23 35                      | 7 3                             | E. Azim.   | — 18.     | 46 55                        | 79 35                      | 14 44                           | E. Azim. Ta.         |
| — 19.    | 4 18                         | 22 50                      | 6 20                            | E. Amp.  | — 19.     | 45 56                        | 79 27                      | 12 30                           | M. Azim. Ta.         |
| — 20.    | 3 15                         | 23 40                      | 6 12                            | M. Azim.   | — 20.     | 41 0                         | 79 33                      | 13 30                           | M. Azim.             |
| — 21.    | 2 58                         | 24 8                       | 6 30                            | E. Azim.   | — 21.     | 40 25                        | 79 30                      | 13 29                           | E. Azim. Ta.         |
| — 22.    | 3 5                          | 23 12                      | 6 10                            | Dicto.   | — 22.     | 40 25                        | 79 30                      | 12 52                           | Dicto.               |
| — 23.    | 3 0                          | 21 42                      | 6 19                            | E. Amp.  | — 23.     | 39 12                        | 79 20                      | 12 56                           | E. Amp.              |
| — 24.    | 2 49                         | 20 28                      | 6 55                            | Dicto.   | — 24.     | 36 30                        | 78 25                      | 13 36                           | E. Azim. Ta.         |
| — 25.    | 2 32                         | 19 12                      | 7 15                            | E. Azim.   | — 25.     | 35 35                        | 79 30                      | 9 56                            | E. Azim.             |
| — 26.    | 1 37                         | 19 45                      | 7 26                            | M. Amp.  | May 6.    | 33 55                        | 80 9                       | 12 58                           | M. Azim. Ta.         |
| — 27.    | 0 20                         | 21 0                       | 7 2                             | E. Azim.   | — 7.      | 27 38                        | 88 58                      | 7 10                            | M. Azim.             |
| — 28.    | South.                       |                            |                                 |  | — 10.     | 26 18                        | 90 53                      | 4 45                            | Dicto.               |
| — 29.    | 1 28                         | 23 3                       | 6 36                            | M. Azim.   | — 13.     | 23 18                        | 95 56                      | 4 0                             | E. Azim.             |
| — 30.    | 2 52                         | 24 0                       | 5 23                            | Dicto.   | — 15.     | 22 55                        | 98 45                      | 4 0                             | M. Amp.              |
| — 31.    | 3 30                         | 24 26                      | 5 30                            | E. Amp.  | — 17.     | 22 0                         | 102 29                     | 4 1                             | Dicto.               |
| Sept. 1. | 4 57                         | 25 14                      | 5 20                            | E. Azim.   | — 20.     | 21 4                         | 109 50                     | 1 30                            | Dicto.               |
| — 2.     | 5 0                          | 25 15                      | 5 23                            | E. Amp.  | — 21.     | 21 1                         | 110 36                     | 0 29                            | E. Amp.              |
| — 3.     | 7 2                          | 25 48                      | 4 12                            | E. Azim.   | — 22.     | 20 25                        | 113 47                     | 0 30                            | E. Amp.              |
| — 4.     | 9 2                          | 26 49                      | 3 20                            | Dicto.   | — 27.     | 16 52                        | 124 23                     | 0 30                            | E. Azim.             |
| — 5.     | 11 40                        | 28 13                      | 1 54                            | Dicto.   | — 29.     | 16 20                        | 126 20                     | 4 24                            | M. Azim. Ta.         |
| — 6.     | 11 40                        | 28 13                      | 1 30                            | Dicto.   | — 30.     | 15 40                        | 128 25                     | 0 36                            | M. Azim.             |
| — 7.     | 14 8                         | 29 47                      | 0 56                            | Dicto.   | June 1.   | 15 0                         | 131 19                     | 0 54                            | E. Azim.             |
| — 8.     | 16 21                        | 31 5                       | 0 36                            | E. Amp.  | — 3.      | 13 56                        | 134 3                      | 2 0                             | E. Amp.              |
| — 9.     | 19 0                         | 33 4                       | 2 18                            | E. Azim.   | — 4.      | 13 50                        | 135 58                     | 3 20                            | Dicto.               |
| — 10.    | 19 46                        | 34 4                       | 3 50                            | M. Azim.   | — 5.      | 13 52                        | 137 25                     | 4 0                             | M. Amp.              |
| — 11.    | 20 23                        | 34 44                      | 4 10                            | E. Azim.   | — 6.      | 14 7                         | 140 46                     | 6 30                            | E. Amp.              |
| — 12.    | 20 25                        | 34 46                      | 4 15                            | E. Amp.  | — 9.      | 14 16                        | 144 39                     | 4 50                            | Dicto.               |
| — 13.    | 20 40                        | 36 23                      | 4 38                            | M. Azim.   | — 14.     | 14 40                        | 150 33                     | 6 48                            | E. Azim.             |
| — 14.    | 21 43                        | 38 45                      | 4 12                            | E. Amp.  | — 19.     | 13 15                        | 162 5                      | 9 15                            | Dicto.               |
| — 15.    | 21 43                        | 38 45                      | 4 12                            | E. Amp.  | — 24.     | 8 10                         | 172 5                      | 10 30                           | M. Azim.             |
| — 16.    | 26 20                        | 42 24                      | 6 49                            | E. Azim.   | — 25.     | 8 34                         | 173 17                     | 11 10                           | M. Amp.              |
| — 17.    | 28 8                         | 43 15                      | 7 20                            | Dicto.   | — 30.     | 8 40                         | 174 0                      | 10 50                           | E. Amp.              |
| — 18.    | 30 16                        | 44 6                       | 8 34                            | Dicto.   |           |                              | East.                      |                                 |                      |
| — 19.    | 35 48                        | 46 42                      | 11 57                           | Dicto.   | July 7.   | 6 3                          | 178 45                     | 10 4                            | E. Azim.             |
| — 20.    | 35 48                        | 46 44                      | 12 8                            | E. Amp.  |           | North.                       |                            |                                 |                      |
| — 21.    | 36 43                        | 47 45                      | 13 1                            | Dicto.   |           | 2 46                         | 176 12                     | 10 50                           | Dicto.               |
| — 22.    | 42 40                        | 61 45                      | 19 38                           | E. Azim.   |           |                              |                            |                                 |                      |

# VARIATIONS OF THE COMPASS.

| 1765.  | Latitude of the Ship. South. | Longit. of the Ship. West. | Variation of the Compass. East. | Time when and Means. | 1766.     | Latitude of the Ship. South. | Longit. of the Ship. West. | Variation of the Compass. East. | Time when and Means. |
|--|------------------------------|----------------------------|---------------------------------|----------------------|-----------|------------------------------|----------------------------|---------------------------------|----------------------|
| July 15.   | 13 12                        | 168 43                     | 9 12                            | M. Azim.             | Jan. 24.  | 28 31                        | 50 13                      | 20 31                           | M. Azim.             |
| July 10.   | 13 8                         | 165 31                     | 10 3                            | Ditto.               | Jan. 25.  | 28 42                        | 49 39                      | 22 0                            | E. Amp.              |
| July 17.   | 13 8                         | 164 22                     | 10 15                           | Ditto.               | Jan. 26.  | 29 34                        | 46 4                       | 24 10                           | Ditto.               |
| July 18.   | 13 11                        | 162 8                      | 10 35                           | E. Amp.              | Jan. 28.  | 30 31                        | 43 19                      | 24 11                           | Ditto.               |
| July 19.   | 13 16                        | 161 0                      | 9 50                            | Ditto.               | Jan. 29.  | 30 58                        | 40 58                      | 24 40                           | Ditto.               |
| July 21.   | 13 28                        | 158 54                     | 9 11                            | M. Azim.             | Jan. 30.  | 30 58                        | 40 56                      | 24 48                           | Ditto.               |
| July 22.   | 14 10                        | 157 11                     | 8 52                            | M. Amp.              | Jan. 31.  | 31 0                         | 39 20                      | 24 30                           | Ditto.               |
| July 23.   | 14 55                        | 155 5                      | 8 0                             | M. Azim.             | Feb. 1.   | 31 37                        | 37 55                      | 24 30                           | E. Amp.              |
| July 24.   | 15 14                        | 151 58                     | 7 33                            | E. Amp.              | Feb. 2.   | 33 15                        | 34 14                      | 24 39                           | Ditto.               |
| July 26.   | 15 21                        | 150 39                     | 6 20                            | Ditto.               | Feb. 4.   | 34 0                         | 32 47                      | 24 17                           | Ditto.               |
| July 28.   | 15 15                        | 149 29                     | 7 0                             | M. Amp.              | Feb. 5.   | 33 53                        | 28 45                      | 23 40                           | M. Amp.              |
| Oct. 11.   | 18 20                        | 139 49                     | 3 30                            | M. Azim.             | Feb. 6.   | 33 55                        | 27 48                      | 23 0                            | Ditto.               |
| Oct. 14.   | 19 10                        | 136 20                     | 2 20                            | M. Amp.              | Feb. 9.   | 34 20                        | 26 45                      | 22 36                           | E. Amp.              |
| Oct. 15.   | 19 38                        | 133 48                     | 1 20                            | E. Amp.              | Feb. 10.  | 35 22                        | 23 40                      | 22 0                            | Ditto.               |
| Oct. 17.   | 20 36                        | 128 30                     | 0 52                            | Ditto.               | Feb. 11.  | 34 40                        | 21 31                      | 22 0                            | M. Amp.              |
| Oct. 22.   | 21 0                         | 120 25                     | 1 5                             | Ditto.               | Feb. 12.  | 35 2                         | 21 15                      | 21 49                           | Ditto.               |
| Oct. 26.   | 11 37                        | 113 32                     | 0 0                             | Ditto.               | Mar. 5.   | 33 50                        | 18 20                      | 18 30                           | E. Amp.              |
| Nov. 1.  | 4 58                         | 105 44                     | 0 52                            | Ditto.               | Mar. 13.  | 17 32                        | 1 13                       | 14 0                            | Ditto.               |
| Nov. 7.  | 2 23                         | 105 1                      | 0 32                            | E. Azim.             | Mar. 14.  | 16 38                        | 1 6                        | 13 50                           | Ditto.               |
| Nov. 26.   |                              |                            | 0 18                            | M. Amp.              | Mar. 15.  | 16 0                         | 3 35                       | 12 15                           | Ditto.               |
| The South Watcher on the Coast of Java<br>S. by E. $\frac{1}{2}$ E. dist. 3 leagues. |                              |                            |                                 |                      | Mar. 17.  | 14 26                        | 8 3                        | 12 5                            | M. Amp.              |
| Dec. 21.   | 8 10                         | 104 0                      | 2 30                            | E. Amp.              | Mar. 18.  | 13 37                        | 8 59                       | 11 14                           | E. Amp.              |
| Dec. 24.   | 8 56                         | 104 44                     | 2 20                            | M. Azim.             | Mar. 19.  | 12 44                        | 9 53                       | 11 0                            | M. Amp.              |
| Dec. 26.   | 9 17                         | 104 47                     | 2 20                            | E. Azim.             | Mar. 20.  | 11 50                        | 10 52                      | 11 18                           | E. Amp.              |
| Dec. 30.   | 10 26                        | 105 45                     | 2 50                            | Ditto.               | Mar. 21.  | 9 46                         | 12 25                      | 10 8                            | E. Azim.             |
| Dec. 31.   | 11 45                        | 106 16                     | 3 29                            | M. Amp.              | Mar. 23.  | 8 59                         | 13 4                       | 10 0                            | M. Azim.             |
| 1766.  | 12 33                        | 105 12                     | 3 21                            | E. Amp.              | Mar. 28.  | 1 26                         | 18 18                      | 9 30                            | E. Amp.              |
| Jan. 1.  | 13 3                         | 104 52                     | 2 49                            | M. Azim.             | North.    |                              |                            |                                 |                      |
| Jan. 3.  | 14 24                        | 103 16                     | 2 30                            | M. Amp.              | April 5.  | 1 53                         | 20 52                      | 8 40                            | Ditto.               |
| Jan. 4.  | 15 37                        | 101 28                     | 3 52                            | E. Amp.              | April 8.  | 5 57                         | 28 22                      | 5 10                            | M. Amp.              |
| Jan. 5.  | 16 9                         | 100 30                     | 4 7                             | Ditto.               | April 11. | 6 19                         | 28 54                      | 5 46                            | E. Amp.              |
| Jan. 10.   | 19 34                        | 86 36                      | 5 0                             | M. Amp.              | April 12. | 8 16                         | 32 32                      | 3 30                            | M. Amp.              |
| Jan. 11.   | 20 10                        | 81 41                      | 5 10                            | E. Amp.              | April 13. | 13 44                        | 35 48                      | 4 33                            | Ditto.               |
| Jan. 12.   | 20 16                        | 78 3                       | 5 24                            | Ditto.               | April 14. | 14 56                        | 36 12                      | 4 10                            | E. Amp.              |
| Jan. 13.   | 20 20                        | 74 44                      | 5 56                            | Ditto.               | April 15. | 17 1                         | 37 4                       | 4 25                            | Ditto.               |
| Jan. 14.   | 20 27                        | 73 12                      | 5 52                            | M. Azim.             | April 17. | 17 58                        | 37 24                      | 4 47                            | Ditto.               |
| Jan. 16.   | 20 35                        | 71 52                      | 6 45                            | E. Amp.              | April 18. | 18 56                        | 37 51                      | 3 52                            | Ditto.               |
| Jan. 17.   | 21 4                         | 67 36                      | 8 50                            | M. Amp.              | April 19. | 20 42                        | 38 32                      | 4 11                            | Ditto.               |
| Jan. 18.   | 21 12                        | 66 11                      | 9 40                            | E. Amp.              | April 20. | 23 2                         | 40 04                      | 4 55                            | M. Azim.             |
| Jan. 20.   | 21 48                        | 63 18                      | 10 52                           | Ditto.               | April 21. | 25 47                        | 40 58                      | 6 0                             | E. Amp.              |
| Jan. 21.   | 22 21                        | 62 8                       | 11 10                           | M. Amp.              | April 22. | 27 39                        | 41 23                      | 5 50                            | Ditto.               |
| Jan. 22.   | 22 52                        | 61 0                       | 13 31                           | E. Amp.              | April 23. | 28 20                        | 41 19                      | 6 22                            | M. Azim.             |
| Jan. 23.   | 24 57                        | 57 57                      | 15 10                           | M. Amp.              | April 25. | 31 58                        | 40 10                      | 6 53                            | M. Amp.              |
| Jan. 24.   | 26 17                        | 56 5                       | 16 55                           | M. Azim.             | April 26. | 32 54                        | 39 35                      | 8 30                            | E. Amp.              |
| Jan. 25.   | 28 3                         | 51 57                      | 20 22                           | M. Azim.             | April 27. | 38 19                        | 36 40                      | 10 0                            | Ditto.               |
| Jan. 26.   | 28 18                        | 51 00                      | 21 30                           | E. Amp. Ta.          |           |                              |                            |                                 |                      |

Those marked Ta. were observed on board the Tamer.

# ASTRONOMICAL OBSERVATIONS

Made on Board His MAJESTY'S Ship the DOLPHIN,

In her SECOND VOYAGE Round the WORLD,

UNDER THE COMMAND OF

SAMUEL WALLIS, ESQ.

In the YEARS 1766, 1767, and 1768.





## 3

| 1766.             | Time by the Watch.   | Alt. $\odot$ 's L.L. or *. | Moon's Altitude.  | Diff. $\odot$ 's L. from $\odot$ or *. | Ship's Latitude S.  | Long. W. of Greenwich. | Number of Observ. | PHENOMENA AND REMARKS.   |
|-------------------|--|----------------------------|---|--|---|------------------------|-------------------|--|
|                   | H  |                            |   |  |   |                        |                   |  |
| $\odot$ Dec. 7.   | 1 50 8   | 56 47                      | 33 40 U.  | 74 27 0                                | 47 26   | 66 33 $\frac{1}{2}$    | * 3               | $\odot$ and $\odot$ . By the ship's run, the Tower Rock, in Port Desfire, bore S. W. $\frac{1}{2}$ S. true, at the time when this observation was taken, distant 13 leagues. Hence the latitude of the Tower Rock is $47^{\circ} 56'$ S. and its longitude $67^{\circ} 10'$ W.   |
| $\odot$ — 22.     | 19 33 55   | 132 33                     | 129 12 U.   | 100 31                                 | 30 52 30  | 1 69 52 $\frac{1}{2}$  | * 4               | $\odot$ and $\odot$ . At anchor in the Straits of Magellan, and Point Possession bearing N. E. by E. distant 5 leagues; the Afs's Ears N. W. by W. $\frac{1}{2}$ W. 4 or 5 leagues, and the First Narrows S. S. W. distant 4 leagues.  |
| $\odot$ — 25.     | 17 46 25   | 117 2 $\frac{1}{2}$        | 148 4 U.  | 66 59 20                               | 53 12   | 1 71 7 $\frac{1}{2}$   | * 4               | $\odot$ and $\odot$ . Off Porpoise Point, near the south end of Elizabeth's Island, in the Straits of Magellan. Capt. Wallis makes Porpoise Point 4' to the northward, and 5' 25" in longitude to the eastward of the place where this observation was taken; and Port Famine 31' to the southward, and 7' 25" to the eastward of it.  |
| 1767.             |  |                            |   |  |   |                        |                   |  |
| $\odot$ April 20. | 19 44 0  | 10 8                       | 60 06 L.  | 90 51 0                                | 42 30   | 95 46                  | * 3               | $\odot$ and $\odot$ .  |
| $\odot$ May 3.    | 3 29 45  | 22 6                       | 33 21 L.  | 68 6 40                                | 29 13   | 96 18 $\frac{1}{2}$    | * 3               | $\odot$ and $\odot$ .  |
| $\odot$ — 19.     | 20 54 0  | 28 38                      | 46 51 L.  | 93 21 0                                | 21 0  | 106 46 $\frac{1}{2}$   | * 5               | $\odot$ and $\odot$ .  |
| $\odot$ — 22.     | 20 43 0  | 26 43                      | 61 11 L.  | 53 1 44                                | 20 20   | 112 22 $\frac{1}{2}$   | * 4               | $\odot$ and $\odot$ .  |
| $\odot$ — 31.     | 3 17 0   | 25 41                      | 48 5 L.   | 49 43 55                               | 20 38   | 127 59                 | * 4               | $\odot$ and $\odot$ .  |
| $\odot$ June 1.   | 4 2 0  | 17 0                       | 52 15 L.  | 61 14 40                               | 20 40   | 129 7                  | * 4               | $\odot$ and $\odot$ .  |
| $\odot$ — 2.      | 3 6 0  | 28 5                       | 47 11 L.  | 72 10 30                               | 19 30   | 129 45 $\frac{1}{2}$   | * 2               | $\odot$ and $\odot$ .  |
| $\odot$ — 10.     | 6 48 0   | 69 31                      | 30 40 L.  | 45 26 0                                | 19 20   | 138 45                 | * 3               | $\odot$ and Spica Virginia.  |
|                   |  |                            |   |  |   |                        |                   | The apparent time at the ship when this observation was taken, is said to be $6^h 47' 34''$ . It does not, however, appear how it has been derived. The altitude of the star gives only $6^h 41' 29''$ , but it is too near the meridian. Taking the apparent time at the ship, as put down by Capt. Wallis, the longitude deduced from this observation is as above. Queen Charlotte's Island bore N. $80^{\circ}$ E. distance 40 miles, and Egmont Isle E. $\frac{1}{2}$ N. distance 15 miles. |
| $\odot$ — 18.     | 20 20 0  | 22 01                      | 151 37 L.   | 81 12 36                               | 17 52   | 148 59 $\frac{1}{2}$   | * 1               | $\odot$ and $\odot$ . Onaburg Island (Miatea) bore N. $82^{\circ}$ E. distance 56 miles when this observation was taken; and the ship was off the N. E. end of King GEORGE the Third's Island.   |
| $\odot$ — 20.     | 19 35 0  | 13 17 $\frac{1}{2}$        | 153 37 $\frac{1}{2}$ U.   | 55 9 50                                | 17 30   | 149 14 $\frac{1}{2}$   | * 3               | $\odot$ and $\odot$ . This observation was taken 6 leagues to the eastward of that where the observation was taken on the 18th, and about 15 miles east of Point Venus.  |
| $\odot$ July 3.   | 2 53 0   | 131 17 0                   | 49 30   | 186 56 12                              | 17 30   | 149 58 $\frac{1}{2}$   | * 1               | $\odot$ and $\odot$ In. Matavai Bay.   |
| $\odot$ — 24.     | 18 49 50<br>18 52 30<br>19 3 20<br>19 6 0<br>19 59 0<br>20 1 48<br>20 10 12<br>20 13 0 |                            | Beginning of the solar Eclipse.<br>Apparent Time $18^h 52' 23''$ .<br>8 43<br>8 43<br>End of the solar Eclipse.<br>Apparent Time $20^h 1' 48''$<br>22 52<br>22 52 |  | By Mr. Harrison, the Purser,<br>By Mr. Robertson, the Master.<br>Apparent Time $19^h 5' 53''$ .<br>17 29 $\frac{1}{2}$<br>By Mr. Harrison,<br>By Mr. Robertson.<br>Apparent Time $20^h 13' 00''$ .<br>17 29 $\frac{1}{2}$ |                        |                   | Observed on Point Venus: the height of the Observer's eye being about 9 feet above the surface of the sea. The beginning is said to be a little uncertain; but the end was supposed to be well observed: the longitude, however, resulting from it is only $148^{\circ} 32'$ west.   |

## ASTRONOMICAL OBSERVATIONS.

| 1767.             | Time by the Watch. | Alt. $\odot$ 's L. or $\ast$ . | Moon's Altitude.        | Dist. $\odot$ 's L. from $\odot$ or $\ast$ . | Ship's Latitude S.  | Long. W. of Greenwich. | Number of Observ. | PHENOMENA AND REMARKS.   |
|-------------------|--------------------|--------------------------------|-------------------------|--|---------------------|------------------------|-------------------|--|
|                   | H                  | "                              | "                       | "  | "                   | "                      | "                 |  |
| 2 July 30.        | 2 23 0             | 40 00                          | 70 40 U.                | 57 17 0                                      | 16 44               | 154 46 $\frac{1}{2}$   | * 1               | $\odot$ and $\odot$ . Howe's Island E. distant 12 leagues. They had now made 5° 0' of longitude from King George the Third's Island.   |
| 2 — 31.           | 2 39 0             | 37 37                          | 67 5 U.                 | 68 28 15                                     | 16 26               | 156 00 $\frac{1}{2}$   | * 4               | $\odot$ and $\odot$ . Scilly Isles S. 74° E. distant 10 leagues. The log gave 50' difference of longitude between Lord Howe's and Scilly Islands.  |
| $\odot$ Aug. 16.  | 20 43 8            | 33 41                          | 41 48 U.                | 74 27 23                                     | 12 38               | 177 5                  | * 3               | $\odot$ and $\odot$ . Wallis's Island S. E. by S. distant 18 leagues.  |
| $\odot$ — 17.     | 22 7 20            | 51 32 $\frac{1}{2}$            | 38 56 $\frac{1}{2}$ U.  | 61 56 12                                     | 11 8                | 178 29 $\frac{1}{2}$   | * 3               | $\odot$ and $\odot$ . This observation was made 1° 3' to the westward of the place where yesterday's observation was made, according to the run by the log.  |
| 24 — 27.          | 22 37 30           | 67 42                          | 24 28 $\frac{1}{2}$ U.  | 49 57 7                                      | 0 28 N.             | 187 27 $\frac{1}{2}$   | * 3               | $\odot$ and $\odot$ . They made 5° 0' west longitude from the place where this observation was made to the Piscadore Islands.  |
| $\odot$ Sept. 14. | 22 25 13           | 63 12                          | 37 51 $\frac{1}{2}$ L.  | 78 34 57                                     | 15 4 N.             | 209 21 $\frac{1}{2}$   | * 3               | $\odot$ and $\odot$ . When this observation was taken they had made 16° 30' west longitude from the Piscadore Islands.   |
| 24 — 16.          | 21 20 5            | 47 46                          | 175 53 $\frac{1}{2}$ U. | 55 45 33                                     | 15 0 N.             | 212 20                 | * 3               | $\odot$ and $\odot$ . They made 1° 26' of west longitude from the place where this observation was made, to the place where they anchored at Tinian.   |
| 24 — 17.          | 21 20 6            | 48 13 $\frac{1}{2}$            | 186 52 $\frac{1}{2}$ U. | 44 29 45                                     | 15 4 N.             | 213 18 $\frac{1}{2}$   | * 3               | $\odot$ and $\odot$ . The South End of Tinian W. distant 7 or 8 leagues, and the South End of Saypan W. by N.  |
| 25.               | Noon.              | 73 49                          |                         |  | 14 54 $\frac{1}{2}$ |                        |                   | $\odot$ 's Merid. Altitude.  |
| $\odot$ — 27.     | 3 32 26            | 34 39                          | 49 37 L.                | 56 41 41                                     | 54 56 N.            | 215 10 $\frac{1}{2}$   | * 4               | $\odot$ and $\odot$ . At anchor off the S. W. side of Tinian, about a mile from the shore.   |
| 29.               | 3 24 43            | 36 31                          | 39 27 $\frac{1}{2}$ U.  | 80 14 17                                     | 14 56 N.            | 214 26 $\frac{1}{2}$   | * 3               | $\odot$ and $\odot$ . At anchor off Tinian.  |
| 2 Octo. 16.       | 22 59 41           | 58 2 $\frac{1}{2}$             | 58 31 L.                | 52 10 23                                     | 16 8 N.             | 215 9 $\frac{1}{2}$    | * 3               | $\odot$ and $\odot$ . West of Tinian by account 2° 15'.  |
| 2 — 28.           | 2 19 2             | 41 8 $\frac{1}{2}$             | 27 41 $\frac{1}{2}$ L.  | 74 52 49                                     | 21 20 N.            | 239 20 $\frac{1}{2}$   | * 3               | $\odot$ and $\odot$ . Grafton Isle, or the most northerly of the Bashees, S. S. E. distant 6 leagues; and Monmouth Isle, the highest of them, S. by E. $\frac{1}{2}$ E. These two islands lie north and south of each other. |
| 24 — 29.          | 2 10 40            | 43 10                          | 19 12                   | 87 28 10                                     | 20 24 N.            | 241 32                 | * 1               | $\odot$ and $\odot$ . In 2° 36' W. of Grafton Isle by the log. The altitudes are corrected for dip and Semidiameter.   |
| 2 Nov. 14.        | 20 57 35           | 40 12 $\frac{1}{2}$            | 176 40 U.               | 60 34 17                                     | 1 45 N.             | 253 46 $\frac{1}{2}$   | * 3               | $\odot$ and $\odot$ . The south end of Pulo Aroe, called Pulo Aor by some, but by the natives Pulo Wawoor, N. W. by N. distant 17 leagues.   |

# ASTRONOMICAL OBSERVATIONS.

5

| 1768.  | Time by the Watch. | Alt. of $\odot$ 's L.L. or $\star$ . | Moon's Altitude. | Dist. $\odot$ 's L. from $\odot$ or $\star$ . | Ship's Latitude S. | Long. W. of Greenwich. | Number of Observ. | PHENOMENA AND REMARKS. |     |    |    |    |                  |    |     |                  |   |  |  |
|--|--------------------|--------------------------------------|------------------|---|--------------------|------------------------|-------------------|------------------------|-----|----|----|----|------------------|----|-----|------------------|---|--|--|
|  | H                  | "                                    | °                | '   | °                  | '                      | °                 | '                      |     |    |    |    |                  |    |     |                  |   |  |  |
| $\odot$ Jan. 10.   | 20                 | 44                                   | 24               | 42  | 28                 | 47                     | 13 $\frac{1}{2}$  | U.                     | 89  | 55 | 20 | 23 | 12               | S. | 298 | 10               | 3 | $\odot$ and $\odot$ .  |  |
| $\odot$ ——— 11.  | 23                 | 2                                    | 31               | 76  | 7 $\frac{1}{2}$    | 25                     | 24 $\frac{1}{2}$  | U.                     | 78  | 0  | 27 | 23 | 46               | S. | 299 | 00               | 3 | $\odot$ and $\odot$ . By the log, this observation was made 1° 2' of longitude west of yesterday's observation.                |  |
| $\odot$ ——— 25.  | 2                  | 8                                    | 21               | 57  | 14                 | 17                     | 29 $\frac{1}{2}$  | U.                     | 99  | 20 | 20 | 34 | 24               | S. | 323 | 30               | 3 | $\odot$ and $\odot$ . This observation was made 26° 14' to the westward of the place where the last was, according to the log. |  |
| $\odot$ ——— 26.  | 5                  | 9                                    | 44               | 20  | 14                 | 19                     | 17 $\frac{1}{2}$  | U.                     | 104 | 27 | 57 | 34 | 14               | S. | 323 | 13               | 1 | 3  | $\odot$ and $\odot$ . It had been quite calm the last 24 <sup>h</sup> , and therefore we may suppose this observation was made under the same meridian with that of yesterday.   |
| <p>From the place where the two last observations were made to the Cape of Good Hope, which is in longitude 34<sup>h</sup> 36<math>\frac{1}{2}</math> W. the ship made, according to the log, and taking a mean of the several reckonings, 16° 30' of longitude, instead of 18° 15', the difference by observation. The Journals also remark, that the ship got, in one day, 20 miles to the southward of her account. These two circumstances strongly corroborate the general experience of mariners, that a strong current sets towards the S. W. along the eastern coast of Africa. Captain Wallis farther remarks that he supposes the effect of it, in longitude, must have been greater than the reckoning shews it to be; because they ran upwards of 6 degrees within sight of the land, during which time every one remarked that the ship appeared to go faster by the land than the log shewed her to do; and this circumstance, joined to the desire which every one naturally has to be as near the truth in his reckoning as possible, must have operated to make the error less than it would otherwise have been. Captain Wallis adds, could we have placed that confidence in the Observations which we shall do in future, we might have been some days sooner at the Cape.</p> |                    |                                      |                  |   |                    |                        |                   |                        |     |    |    |    |                  |    |     |                  |   |  |  |
| $\odot$ Feb. 11.   | 19                 | 54                                   | 40               | 30  | 27                 | 180                    | 42                | U.                     | 63  | 41 | 50 | 33 | 54 $\frac{1}{2}$ |    | 134 | 42               | 1 | 3  | These observations were made under the small Fort, which stands on the west side of Table Bay, at the Cape of Good Hope; which Fort is nearly under the same meridian, and about a mile and a half N. of the place where the English observations have been generally made*. |
| $\odot$ March 14.  | 21                 | 18                                   | 22               | 47  | 25                 | 88                     | 19 $\frac{1}{2}$  | L.                     | 44  | 45 | 57 | 16 | 44               |    | 1   | 45 $\frac{1}{2}$ | * | 3  | $\odot$ and $\odot$ { The Lon. made by the log,  |
|  | 22                 | 43                                   | 55               | 65  | 58 $\frac{1}{2}$   | 66                     | 48 $\frac{1}{2}$  | U.                     | 44  | 17 | 20 | 16 | 36               |    | 2   | 20 $\frac{1}{2}$ | * | 3  | $\odot$ and $\odot$ {  |
| <p>from the Cape of Good Hope, at the time of taking these observations, was 21° W. and the log gave 3° 40' W. long. between the time of their making them and their anchoring off James's Fort, in the Island of St. Helena: so that James's Fort is, by these observations, in longitude 5° 43' W. or 6 minutes less than its true long. as determined by astronomical observations made there by the Rev. Dr. Maskelyne, Astronomer Royal, in 1761.</p>   |                    |                                      |                  |   |                    |                        |                   |                        |     |    |    |    |                  |    |     |                  |   |  |  |
| $\odot$ ——— 23.  | 2                  | 13                                   | 47               | 161   | 55 $\frac{1}{2}$   | 138                    | 28 $\frac{1}{2}$  | U.                     | 68  | 43 | 30 | 7  | 28               |    | 14  | 26 $\frac{1}{2}$ | * | 3  | $\odot$ and $\odot$ . The N. W. point of the Island of Ascension bore S. E. by S. 42 miles, when these observations were made. The log gave also 8° 30' diff. of longitude between the Islands of St. Helena and Ascension.  |
| <p>* By the English observations, I mean those which were made by Messrs. Mason and Dixon in 1761; and those made by Mr. Bayley and myself in 1772, 1774, and 1775. These observations were made at the very southern extremity of the Cape Town, near a House which then belonged to a person whose name was Peter Ziemen. The Abbé de la Caille made his observations at a House which is situated on the Strand, towards the northern extremity of the Town, and not far from the Custom-house.</p>   |                    |                                      |                  |   |                    |                        |                   |                        |     |    |    |    |                  |    |     |                  |   |  |  |

## ASTRONOMICAL OBSERVATIONS.

| 1768.  | Time by the Watch. | Alt. ☉'s            | Moon's              | Dist. ☽'s L. | Ship's      | Long. W. of        | Number of Observ. | PHENOMENA AND REMARKS. |
|--|--------------------|---------------------|---------------------|--------------|-------------|--------------------|-------------------|------------------------|
|  |                    | L.L. or *.          | Altitude.           | from ☉ or *. | Latitude N. | Greenwich.         |                   |                        |
|  | H                  | '                   | '                   | '            | '           | '                  |                   |                        |
| 24 April 7.  | 20 47 28           | 39 28 $\frac{1}{2}$ | 18 25 $\frac{1}{2}$ | U. 112 22 27 | 15 8 N.     | 34 30              | 3                 | ☉ and ☽.               |
| ☉ — 10.  | 20 48 27           | 41 18               | 44 35 $\frac{1}{2}$ | U. 76 1 40   | 21 28 N.    | 36 47              | 3                 | ☉ and ☽.               |
| ☽ — 20.  | 3 38 50            | 35 32               | 80 50 $\frac{1}{2}$ | L. 50 54 20  | 33 55 N.    | 32 41              | * 3               | ☉ and ☽.               |
| ☽ — 22.  | 1 59 43            | 53 7 $\frac{1}{2}$  | 45 33 $\frac{1}{2}$ | U. 75 42 20  | 36 15 N.    | 29 19              | * 3               | ☉ and ☽.               |
| ☽ May 9.   | 19 40 0            | 29 23 $\frac{1}{2}$ | 29 6                | L. 82 18 10  | 49 43 N.    | 7 54 $\frac{1}{2}$ | * 3               | ☉ and ☽.               |
| ☽ — 10.  | 22 28 0            | 53 52               | 26 42               | L. 67 50 30  | 48 48 N.    | 7 59               | * 1               | ☉ and ☽.               |
| 24 — 12.   | 22 12 20           | 51 56 $\frac{1}{2}$ | 47 51 $\frac{1}{2}$ | U. 40 44 57  | 49 44 N.    | 7 10 $\frac{1}{2}$ | * 3               | ☉ and ☽. St. Agnes'    |
| Light-House, on the Islands of Scilly, bore north distant 12 miles; the variation allowed. |                    |                     |                     |              |             |                    |                   |                        |

*The End of the Observations made in Capt. Wallis's Voyage.*

DEDUCTIONS *from the preceding* OBSERVATIONS.

1. When the observation of the 7th of December, 1766, was made, the Tower Rock, in Port Desire, bore S. W.  $\frac{1}{2}$  W. the variation being allowed, and was distant 13 leagues by the ship's run: I therefore conclude, that the latitude of the Tower Rock is  $47^{\circ} 56'$  south, and that its longitude, by this observation, is  $67^{\circ} 10'$  west of Greenwich.

2. When the observation was made on the 22d of December, 1766, Point Possession, in the Straits of Magalhaens, bore N. E. by E. distant 5 leagues; and the variation of the compass was  $23^{\circ}$  east: consequently, Point Possession is in latitude  $52^{\circ} 27'$  south, and longitude  $69^{\circ} 28'$  west, by this observation. By the map of the Straits of Magalhaens, which is annexed to Dr. Hawksworth's account of this voyage, Point Possession is  $38^{\circ} 24''$  in longitude west of Cape Virgins: consequently, this observation places Cape Virgins in longitude  $68^{\circ} 49' 36''$  west of Greenwich.

The place where the observation was taken on the 25th of December is, according to the remarks of Capt. Wallis,  $4' 00''$  to the southward, and  $5' 25''$  to the westward of Porpoise Point; and by the above mentioned map of the Straits, Porpoise Point is  $2^{\circ} 22' 15''$  west of Point Possession, or  $3^{\circ} 0' 39''$  west of Cape Virgins. Cape Virgins is therefore in longitude  $68^{\circ} 1' 26''$  west, by this observation. The mean of the two is  $68^{\circ} 25' 31''$  west of Greenwich.

3. The longitude made by the log, according to Capt. Wallis's reckoning, from the time of making the observation May the 31st, 1767, to that of their being a-breast of Whitfun Island was  $10^{\circ} 34'$ : By the Master's reckoning it was  $10^{\circ} 30'$ . The medium is  $10^{\circ} 32'$ : consequently, the longitude of Whitfun Island, by this observation, is  $138^{\circ} 31'$  west. The longitude made, according to Capt. Wallis's reckoning, from the place where the observation was made on the

## 8 ASTRONOMICAL OBSERVATIONS.

1st of June to Whitfun Island, was  $8^{\circ} 59'$ , and by the Master's reckoning  $8^{\circ} 52'$ ; the medium is  $8^{\circ} 55\frac{1}{2}'$ , and the longitude of Whitfun Island, by that observation,  $138^{\circ} 2\frac{1}{2}'$  west. According to Capt. Wallis, the difference of longitude between the place which the ship was in when the observation was made on the 2d of June and Whitfun Island was  $8^{\circ} 20' 30''$ : according to the Master, it was  $8^{\circ} 15' 30''$ ; the medium is  $8^{\circ} 18'$ ; and hence the longitude of Whitfun Island is  $138^{\circ} 3' 15''$  west. The bearings and distances put down by Capt. Wallis make the ship  $41' 40''$  west of Queen Charlotte's Island when the Moon's distance from Spica Virginis was taken on the 10th of June; moreover, his bearings and distances make Queen Charlotte's Island  $7' 45''$  in longitude west of Whitfun Island: consequently, the longitude of Whitfun Island is, by that observation,  $137^{\circ} 55' 35''$  west. Lastly, the longitude made by the log, according to Capt. Wallis, from Whitfun Island to the place which the ship was in when the observation was taken on the 18th of June, was  $10^{\circ} 42'$ : according to the Master, it was  $10^{\circ} 19' 45''$ ; the medium is  $10^{\circ} 30' 52\frac{1}{2}''$ , and, consequently, the longitude of Whitfun Island, by that observation, is  $138^{\circ} 28' 15''$ . The mean of these five determinations is  $138^{\circ} 12' 7''$  west of Greenwich.

4. Hence, from what is observed above, the longitude of Queen Charlotte's Island is  $138^{\circ} 19' 52''$  west of Greenwich.

5. The bearings and distances given by Capt. Wallis, make Egmont Island  $26' 15''$  west of Queen Charlotte's Island, and, therefore, in longitude  $138^{\circ} 46' 7''$  west of Greenwich.

6. Gloucester Island, according to Capt. Wallis, is  $2^{\circ} 8'$  in longitude to the west of Whitfun Island; and, consequently, lies in  $140^{\circ} 20' 7''$  west of Greenwich.

7. Cumberland Island is  $2^{\circ} 40'$  west of Whitfun Island, and, consequently, in longitude  $140^{\circ} 52' 7''$  west of Greenwich.

8. Prince



8. Prince William Henry's Island lies  $3^{\circ} 10'$  in longitude west of Whitfun Island, and, therefore, is  $141^{\circ} 22' 7''$  west of Greenwich. I do not find that the latitude of these six islands can be assigned with a greater probability of truth, than will be done by transcribing them literally from Capt. Wallis's journal, as follows;

|                               |   |   |                     |
|-------------------------------|---|---|---------------------|
| Latitude of Whitfun Island    | - | - | $19^{\circ} 26' S.$ |
| Queen Charlotte's Island      | - | - | $19^{\circ} 18' S.$ |
| Earl of Egmont's Island       | - | - | $19^{\circ} 20' S.$ |
| Glocester Island              | - | - | $19^{\circ} 11' S.$ |
| Cumberland Island             | - | - | $19^{\circ} 18' S.$ |
| Prince William Henry's Island | - | - | $19^{\circ} 0' S.$  |

9. There are some circumstances which incline me to think, that the situation of Osnaburgh Island will be more exactly determined, after I have determined that of Port Royal, or Matavai Bay: I shall therefore endeavour to settle the longitude of this latter place first.

It appears from the bearings and distances, put down with the observations, that the ship was  $34^{\circ} 35''$ , in longitude, east of Port Royal Harbour, when the observation was taken on the 18th of June, and  $15^{\circ} 43''$  east of it, when the observation was taken on the 20th. The longitude of Port Royal Harbour will therefore be, by the former of them,  $149^{\circ} 33' 42''$ ; and by the latter,  $149^{\circ} 30' 21''$  west. It appears also, by the bearings and distances of Lord Howe's and Scilly Islands, put down with the observations of July 30th and 31st, and the differences of longitude made by the log, between these islands, and between the former of them and Port Royal Harbour, that the ship was  $5^{\circ} 00'$  west of that harbour when the observation was made on the 30th, and  $5^{\circ} 41' 16''$  west of it when the observation was made on the 31st: the longitude, therefore, of Port Royal Harbour will be  $149^{\circ} 46' 30''$  by the former of them, and  $150^{\circ} 18' 59''$  by the latter. The mean of these four determinations, and the result of the

## 10—ASTRONOMICAL OBSERVATIONS.

observation which was made July the 3d in the harbour, is  $149^{\circ} 49' 36''$  west of Greenwich.

10. Capt. Wallis makes the difference of longitude between Osnaburgh Island, or Miatea, and Port Royal Harbour  $1^{\circ} 28'$ , which being taken from  $149^{\circ} 49' 36''$ , the longitude of Port Royal Harbour, leaves  $148^{\circ} 21' 36''$  west for the longitude of Osnaburgh Island: but its longitude, according to the observation which was made on the 18th of June, is  $148^{\circ} 00' 45''$ ; the mean of these two is  $148^{\circ} 11' 10''$  west of Greenwich.

11. The bearings and distances, put down by Capt. Wallis and the Master, give, on a medium,  $19' 15''$  for the difference of longitude between the middle of the Duke of York's Island, or Eimeo, and Port Royal Harbour; and, consequently, the longitude of the latter is  $150^{\circ} 8' 51''$  west of Greenwich.

12. Sir Charles Saunders's Island is  $1^{\circ} 7' 0''$  in longitude west of Port Royal Harbour, according to Capt. Wallis's reckoning, and  $1^{\circ} 0' 0''$  by the Master's: the medium of the two is  $1^{\circ} 3' 30''$ ; and the longitude of the island, from thence,  $150^{\circ} 53' 6''$  west of Greenwich.

They made the latitude of Osnaburgh Island  $17^{\circ} 51'$  south. The latitude of Port Royal Harbour  $17^{\circ} 30'$  south. That of the Duke of York's Island  $17^{\circ} 31'$  south, and of Sir Charles Saunders's Island  $17^{\circ} 28'$  south.

13. The ship made  $5^{\circ} 0'$  of longitude westerly between leaving Port Royal Harbour, and making the observation on the 30th of July; at which time she was 12 leagues west of Lord Howe's Island: 12 leagues, in the latitude of  $16^{\circ} \frac{1}{2}$ , makes  $37' 30''$  difference of longitude, which being taken from  $5^{\circ} 00'$ , leaves  $4^{\circ} 22' 30''$  for the difference of longitude between Port Royal Harbour and Lord Howe's Island;



Island; and, therefore, this island is in  $154^{\circ} 12' 6''$  of west longitude. By allowing the difference of longitude corresponding to 12 leagues, the distance which the ship was west of Lord Howe's Island when the observation was made, that observation will give the longitude of the island  $154^{\circ} 9' 0''$  west. Lastly, allowing the difference of longitude, shewn by the log, between Lord Howe's and Scilly Islands, and  $28' 46''$  for the difference of longitude corresponding to the bearing and distance of Scilly, when the observation was made on the 31st of July, we shall find, that the ship, at the time of taking that observation, was  $1^{\circ} 18' 46''$  west of Lord Howe's Island, and, consequently, the longitude of Lord Howe's Island, by that observation, is  $154^{\circ} 41' 29''$  west. The mean of these three determinations is  $154^{\circ} 20' 52''$  west of Greenwich.

14. By adding  $50'$ , the difference of longitude made by the log, to the longitude of Lord Howe's Island, we obtain the longitude of Scilly =  $155^{\circ} 10' 52''$  west of Greenwich.

The latitude of Lord Howe's Island is  $16^{\circ} 46'$  south, and that of Scilly  $16^{\circ} 28'$  south, according to Capt. Wallis; and I see no reason for objecting to them.

15. When the observation was made on the 16th of August, Wallis's Island bore S. E. by S. distant 54 miles: consequently, the ship was west of it in longitude  $30' 48''$ , and the longitude of Wallis's Island, by that observation, is  $176^{\circ} 34' 12''$  west. From this time to that when the observation was taken on the 17th, the ship made  $1^{\circ} 3'$  west longitude, and, consequently, was then  $1^{\circ} 33' 48''$  west of the island. The longitude of the island is, therefore, by that observation,  $176^{\circ} 55' 50''$  west. The mean of the two is  $176^{\circ} 45' 1''$  west of Greenwich. The latitude of this island is  $13^{\circ} 17'$  south.

16. According to Capt. Wallis's reckoning and bearings, Wallis's Island is  $2^{\circ} 38' 13''$  in longitude west of Boscawen's Island, and

$2^{\circ} 35' 28''$  west of Keppel's Island. By the Master's reckoning and bearings, these numbers are  $2^{\circ} 36' 31''$  and  $2^{\circ} 33' 47''$ : the two mediums are  $2^{\circ} 37' 22''$  and  $2^{\circ} 34' 37''$ ; and, consequently, the longitude of the former island will be  $174^{\circ} 7' 39''$ , and that of the latter  $174^{\circ} 10' 24''$  west of Greenwich. Their latitudes are  $15^{\circ} 50'$ , and  $15^{\circ} 56\frac{1}{2}'$  south, respectively.

17. From the time of taking the observation on the 27th of August, which gave  $187^{\circ} 27' 30''$  west, to that of their arrival at the Piscadore Islands, the ship made exactly  $5^{\circ}$  of west longitude; and, consequently, the longitude of the Piscadores is  $192^{\circ} 27' 30''$  west by that observation. But from the Piscadores to the time of taking the observation on the 14th of September, the ship made  $16^{\circ} 30'$  of west longitude; and, consequently, the longitude of the Piscadores, by this latter observation, is  $192^{\circ} 51' 52''$  west. The mean of the two is  $192^{\circ} 39' 41''$  west of Greenwich. The latitudes of the two islands which they saw, were  $11^{\circ} 00'$  and  $11^{\circ} 20'$  south.

18. The observation on the 16th of September, 1767, gave  $212^{\circ} 20'$  west, for the longitude of the ship when the observation was taken; and they made  $1^{\circ} 26'$  of west longitude from this time to that of their coming to an anchor on the S. W. side of the island of Tinian. The longitude of Tinian Road is, therefore,  $213^{\circ} 46'$  west, by that observation. Two observations made on the 27th and 30th of September, while the ship was at anchor there, gave  $215^{\circ} 10' 30''$  and  $214^{\circ} 26'\frac{1}{2}$  west. When the observation was taken on the 16th, the ship had made  $2^{\circ} 15'$  of west longitude from Tinian; and, therefore, as that observation gave the longitude of the ship  $215^{\circ} 9'\frac{1}{2}$  west, the longitude of Tinian will be  $212^{\circ} 54' 30''$  west. The mean of the four is  $214^{\circ} 4'\frac{1}{2}$  west of Greenwich. The latitude observed on board the ship, at anchor, was  $14^{\circ} 58'$  north.

19. The bearings and distances of the two most easterly of the Bassée Islands place them  $6' 30''$  of longitude east of the ship, when  
the

the observation was made on the 28th of October: these islands are, therefore, in  $239^{\circ} 13' \frac{1}{2}$  west, by that observation. At the time when the observation was taken on the 29th, they had made  $2^{\circ} 36'$  west longitude from these islands; and, consequently, that observation places them in  $238^{\circ} 56'$  west. The mean of the two is  $239^{\circ} 4' 49''$  west. Capt. Wallis makes the latitude of Grafton Island  $21^{\circ} 4'$  north.

20. Capt. Wallis's reckoning gives  $15^{\circ} 14'$  of longitude between Grafton Island and Pulo Condore; Mr. Harrison's, the Purser,  $15^{\circ} 16'$ ; and the Master made  $15^{\circ} 24'$  of it: the medium is  $15^{\circ} 18'$ , which being added to  $239^{\circ} 4' 49''$ , the longitude of Grafton Island, gives  $254^{\circ} 22' 49''$  west, for the longitude of Pulo Condore, by the observations of the 28th and 29th of October. Again, Capt. Wallis made  $1^{\circ} 3'$  west longitude from Pulo Condore to the place the ship was in, when the observation was taken on the 14th of November; Mr. Harrison  $1^{\circ} 13'$ ; and the Master  $1^{\circ} 5'$ : the medium is  $1^{\circ} 7'$ , which being taken from  $253^{\circ} 46' 30''$ , the longitude given by the observation, leaves  $252^{\circ} 39' 30''$  west, for the longitude of Pulo Condore, by this observation: the medium is  $253^{\circ} 31' 10''$  west of Greenwich, which is about ten minutes more than Capt. King's determination of it in the last voyage, and sixteen minutes less than Mr. Bayly's. Capt. Wallis makes the latitude of Pulo Condore  $8^{\circ} 40'$  to  $45'$  north; Mr. Harrison  $8^{\circ} 42'$  north; and the Master's bearings give  $8^{\circ} 41' \frac{1}{2}$  north, for the middle of it.

21. Capt. Wallis, by his survey and reckoning, makes Pulo Timoan, or, as it is called by the natives, Pulo Teoman,\*  $1^{\circ} 45'$  west of Pulo Condore, and, consequently, in  $255^{\circ} 26' 10''$  west longitude from Greenwich. He makes the latitude of it  $2^{\circ} 58'$  north. Mr. Harrison makes the south end of it to lie in latitude  $2^{\circ} 43'$  north.

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\* I am obliged to ALEXANDER DALRYMPLE, Esq. F.R.S. for the native names of these islands.

22. Pulo Aroe, or, according to the natives, Pulo Wawoor, bearing N. W. by N. distant 51 miles, when the observation was made on the 14th of November; we shall find, from thence, having regard to the preceding determinations, that its longitude is  $254^{\circ} 57' 30''$  west of Greenwich, and its latitude  $2^{\circ} 27'$  north; but Mr. Harrison makes its latitude  $2^{\circ} 35'$  N. The data which this is drawn from are not put down.

23. The bearings of Pulo Piffang, called Pulo Pambeelan by the natives, at 4<sup>h</sup>. and 6<sup>h</sup>. on the 14th of November, give the latitude of its south end  $2^{\circ} 40'$  north. By the same bearings, and Capt. Wallis's reckoning, it is  $1^{\circ} 40'$  west of Pulo Condore; by the Master's reckoning it is  $1^{\circ} 52'$  west of it; and by Mr. Harrison's  $1^{\circ} 50'$ : the medium is  $1^{\circ} 47' 20''$ ; which being added to  $253^{\circ} 31' 10''$ , the longitude of Pulo Condore, gives  $255^{\circ} 18' 30''$  west, for the longitude of Pulo Pambeelan.

The reckonings of Capt. Wallis, his Master, and the Purser all end here, and are not resumed until they left Batavia.

24. Between the times of making the observations on the 9th and 12th of May, 1768, at the latter of which times the ship was due south of the Scilly Lights, she made  $1^{\circ} 5\frac{1}{2}'$  of east longitude; which being taken from  $7^{\circ} 54\frac{1}{2}'$ , the longitude given by the observation on the 9th, leaves  $6^{\circ} 49'$  west for the longitude of Scilly Light-house, by that observation. Between the observations on the 10th and 12th, the ship made  $20\frac{1}{2}'$  of east longitude, which being taken from  $7^{\circ} 59'$ , the longitude given by the observation of the 10th, leaves  $7^{\circ} 38\frac{1}{2}'$  west for the longitude of the Light-house, by this observation. The observation which was made on the 12th, when the ship was due south of the Light-house, gave  $7^{\circ} 10\frac{1}{2}'$  west; and the medium of the three is  $7^{\circ} 12' 35''$  west of Greenwich.

# ASTRONOMICAL OBSERVATIONS

Made on Board His MAJESTY'S Ship the ENDEAVOUR,

In her VOYAGE Round the WORLD,

UNDER THE COMMAND OF

J A M E S C O O K, Esq.

In the YEARS 1768, 1769, 1770 and 1771.



# ASTRONOMICAL OBSERVATIONS.

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|         | Time by the Watch. | Alt. $\odot$ 's L.L. or * | Moon's Altitude.       | Dist. $\odot$ 's L. from $\odot$ or * | Ship's Latit. N.    | Long. W. of Greenwich. | Thermo.          | Observ. | PHENOMENA AND REMARKS.  |
|---------|--------------------|---------------------------|------------------------|---------------------------------------|---------------------|------------------------|------------------|---------|---|
|         | H "                | ° '                       | ° '                    | ° ' "                                 | ° '                 | ° '                    |                  |         |   |
| 26.     | Noon.              | 50 28 $\frac{1}{2}$       |                        |                                       | 49 31 $\frac{1}{2}$ |                        | 65               |         | Merid. Alt. Observed on the Poop.                               |
|         | 4 52 30            | 20 0 $\frac{1}{2}$        | Appa. Time             | 4 <sup>h</sup> 42' 52"                | 49 26               |                        |                  |         | Obs. on the Forecastle.   |
|         | 9 46 19            |                           | 24 42 L.               | 18 31 30                              | 49 20               | 6 51 *                 |                  | G.      | $\odot$ & $\beta$ . Capr. faint. Q.D.                           |
| 27.     | Noon.              | 50 56                     |                        |                                       | 48 42 $\frac{2}{3}$ |                        | 64               |         | Merid. Alt. Obs. on P.  |
| 28.     | Noon.              | 52 0                      |                        |                                       | 47 17 $\frac{1}{2}$ |                        | 68               |         | Ditto.  |
| 29.     | Noon.              | 52 19                     |                        |                                       | 46 37               |                        | 66               |         | Ditto. Eye 24f. above sea.                                      |
| 30.     | Noon.              | 52 24 $\frac{1}{2}$       |                        |                                       | 46 9 $\frac{1}{2}$  |                        | 66               |         | Ditto. Obs. on Forecast.  |
| 31.     | Noon.              | 53 9 $\frac{1}{2}$        |                        |                                       | 45 3                |                        | 68               |         | Ditto. Obs. on Q. Deck.   |
| 1 Sept. | Noon.              |                           |                        |                                       | 44 57               |                        | 67               |         | Latitude by account   |
| 2.      | Noon.              |                           |                        |                                       | 43 55               |                        | 68               |         | Ditto.  |
|         | 22 56 53           | 51 31 $\frac{2}{3}$       | 20 36 $\frac{2}{3}$ U. | 91 58 50                              | 44 11               | 8 55 $\frac{1}{2}$ *   |                  | G.      | $\odot$ & $\odot$ . { These obs. are dubious. Obs. on the Poop. |
|         | 23 11 16           | 52 11 $\frac{1}{2}$       | 18 19 U.               | 91 50 10                              | 44 10               | 9 21 $\frac{3}{4}$ *   |                  | G.      |   |
| 3.      | Noon.              | 52 57                     |                        |                                       | 44 9 $\frac{1}{2}$  |                        | 68               |         | Mer. Alt. Obs. on F.C.  |
| 4.      | Noon.              |                           |                        |                                       | 43 40               |                        | 68               |         | Latitude by account.  |
|         | 1 0 11             | 49 30 $\frac{5}{8}$       | 10 8 $\frac{1}{2}$ U.  | 78 2 10                               |                     | 8 40 $\frac{1}{2}$ *   |                  | G.      | $\odot$ & $\odot$ . Good. Observed on the Quarter Deck.         |
|         | 1 21 32            | 47 20 $\frac{1}{6}$       | Appa. Time             | 1 <sup>h</sup> 37' 56"                | 43 34 $\frac{1}{2}$ |                        |                  |         | Observ. on the Q. Deck.   |
|         | 23 25 16           | 52 12 $\frac{5}{8}$       | 35 41 $\frac{1}{6}$ U. | 66 16 10                              |                     | 9 28 *                 |                  | G.      | $\odot$ & $\odot$ . } Pretty good.                              |
|         | 23 41 54           | 53 13 $\frac{1}{2}$       | 32 50 U.               | 66 9 0                                |                     | 9 32 $\frac{3}{4}$ *   |                  | G.      | $\odot$ & $\odot$ . } On the Poop.                              |
| 5.      | Noon.              | 53 18                     |                        |                                       | 43 3 $\frac{3}{4}$  |                        | 67               |         | Meridian Alt. Q. Deck.  |
|         | 3 33 44            | 28 2                      | Appa. Time             | 3 <sup>h</sup> 48' 16"                | 42 56               |                        |                  |         | Observ. on the Q. Deck.   |
|         | 15 48 00           | 58 37 $\frac{1}{2}$       | 33 0 $\frac{1}{2}$ L.  | 40 44 30                              |                     | 10 10 $\frac{1}{2}$ *  |                  | G.      | $\odot$ and Aldebaran. Q.D.                                     |
|         | 21 28 57           | 42 41                     | Appa. Time             | 21 <sup>h</sup> 41' 45"               | 42 4                |                        |                  |         | Observ. on the Q. Deck.   |
|         | 22 7 6             | 47 41                     | 57 45 U.               | 54 26 10                              |                     | 9 4 $\frac{1}{2}$ *    |                  | G.      | $\odot$ & $\odot$ . } Observed on the Poop.                     |
|         | 22 15 40           | 48 36 $\frac{1}{6}$       | 56 24 $\frac{2}{3}$ U. | 54 22 0                               |                     | 9 35 $\frac{1}{2}$ *   |                  | G.      |   |
|         | 22 57 28           | 52 17 $\frac{5}{8}$       | 49 5 U.                | 54 5 25                               |                     | 10 15 *                |                  | G.      |   |
| 6.      | Noon.              | 53 59                     |                        |                                       | 42 0 $\frac{1}{2}$  |                        | 70               |         | $\odot$ 's Meridian Altitude. Obs. on the Poop.                 |
| 7.      | Noon.              | 55 7 $\frac{1}{2}$        |                        |                                       | 40 28 $\frac{3}{8}$ |                        | 71               |         | $\odot$ 's Meridian Altitude. On the Forecastle.                |
| 8.      | Noon.              |                           |                        |                                       | 38 33               |                        | 71               |         | Latitude by account.  |
| 9.      | Noon.              |                           |                        |                                       | 37 4                |                        | 69               |         | Latitude observed.  |
| 10.     | Noon.              |                           |                        |                                       | 35 20               |                        | 72               |         | Ditto.  |
| 11.     | Noon.              |                           |                        |                                       | 34 01               |                        | 73               |         | Ditto.  |
| 12.     | Noon.              |                           |                        |                                       | 32 42               |                        | 74 $\frac{1}{2}$ |         | Ditto.  |
| 13.     | Noon.              |                           |                        |                                       |                     |                        | 74               |         | In Funchal Road.  |
| 19.     | Noon.              |                           |                        |                                       | 31 45               |                        | 74               |         | Lat. obs. Funchal N. 7° E. true, dist. 49 m.                    |
|         | 4 30 17            | 18 20 $\frac{5}{8}$       | 28 38 $\frac{1}{2}$ U. | 94 35 30                              | 31 36 $\frac{1}{2}$ | 18 35 $\frac{3}{8}$ *  |                  | G.      | $\odot$ & $\odot$ . { On the P. The run since noon              |
|         | 4 44 38            | 15 15 $\frac{3}{4}$       | 29 52 $\frac{2}{3}$ U. | 94 41 20                              | 31 36 $\frac{1}{2}$ | 19 30 $\frac{7}{8}$ *  |                  | G.      | $\odot$ & $\odot$ . } S. S. W. by                               |
|         | 5 18 3             | 8 19 $\frac{1}{6}$        | 32 16 $\frac{1}{2}$ U. | 94 45 40                              | 31 36 $\frac{1}{2}$ | 17 35 *                |                  | G.      | $\odot$ & $\odot$ . } Compa's. dist. 8 miles.                   |
| 20.     | Noon.              |                           |                        |                                       | 31 18               |                        | 75               |         | Latitude observed.  |
| 21.     | Noon.              |                           |                        |                                       | 30 46               |                        | 74               |         | Ditto.  |



# ASTRONOMICAL OBSERVATIONS.

| 1768.     | Time by the Watch. |    | Alt. $\odot$ 's<br>L.L. or * | Moon's<br>Altitude. | Dist. $\odot$ 's L.<br>from $\odot$ or *. | Ship's<br>Latit. N  | Long. W. of<br>Greenwich. | Thermo.               | Oberv.           | PHENOMENA<br>AND<br>REMARKS.   |
|-----------|--------------------|----|------------------------------|---------------------|---|---------------------|---------------------------|-----------------------|------------------|--|
|           | H                  | M  |                              |                     |   |                     |                           |                       |                  |  |
| Sept. 21. | 5                  | 30 | 26                           | 4 25 $\frac{1}{2}$  | 29 27 $\frac{1}{2}$ U.                    | 118 36 30           | 30 30                     | 16 32 $\frac{1}{2}$ * | G.               | $\odot$ & $\odot$ . Rather uncert.<br>The Salvages S. $\frac{1}{2}$ W.<br>true, dist. about 5 leag.                            |
| — 22.     | 10                 | 37 | 33                           | 60 9 $\frac{1}{2}$  | 27 49 $\frac{1}{2}$ U.                    | 52 23 40            | 29 39 $\frac{1}{2}$       | 14 12 $\frac{1}{2}$ * | G.               | $\odot$ & $\alpha$ Peg. Very uncert.<br>$\odot$ 's Mer. Alt. Q. Deck.  |
|           | 4                  | 59 | 3 $\frac{1}{2}$              | 10 40 $\frac{1}{2}$ | Appa. Time 5 <sup>h</sup> 10' 9"          | 29 31               |                           |                       |                  | Obs. on the Q. D. The<br>Peak of Teneriffe W.<br>by S. $\frac{1}{2}$ S. and the G <sup>d</sup> .<br>Canary S. $\frac{1}{2}$ W. |
|           | 13                 | 11 | 46                           |                     | 14 14 $\frac{1}{2}$ L.                    | 38 25 20            | 29 13                     | 14 38 $\frac{1}{2}$ * | G.               | $\odot$ & $\alpha$ Peg. Pretty good.   |
| — 23.     | 21                 | 20 | 27                           | 43 47 $\frac{1}{2}$ | Appa. Time 21 <sup>h</sup> 31' 15"        | 28 56               | 28 50 $\frac{1}{2}$       |                       | 73               | Observ. on the Q. Deck.<br>$\odot$ 's Mer. Alt. Q. Deck.   |
| — 24.     | —                  | —  | —                            | 61 52               |   |                     | 27 10                     |                       | 72 $\frac{1}{2}$ | $\odot$ 's Meridian Altitude.  |
| — 25.     | —                  | —  | —                            | 63 3                |   |                     | 25 35 $\frac{3}{4}$       |                       | 73               | Obs. on the Main Deck.   |
|           | 3                  | 43 | 21                           | 30 41 $\frac{1}{2}$ | Appa. Time 3 <sup>h</sup> 38' 44"         | 25 24               |                           |                       |                  | $\odot$ 's Mer. Alt. Q. Deck.  |
|           | 10                 | 25 | 5                            | 46 21 $\frac{1}{2}$ | 61 24 L.                                  | 61 4 0              |                           | 18 38 *               | G.               | $\odot$ & $\alpha$ Aquilæ. Pretty<br>good. Forecastle.   |
| — 26.     | 21                 | 30 | 43                           | 43 59 $\frac{1}{2}$ | Appa. Time 21 <sup>h</sup> 23' 6"         | 23 57               |                           |                       | 74               | Observ. on the Q. Deck.  |
|           | 4                  | 26 | 8                            | 22 33 $\frac{1}{2}$ | Appa. Time 4 <sup>h</sup> 17' 16"         | 23 21 $\frac{1}{2}$ |                           |                       |                  | $\odot$ 's Mer. Alt. Forecast.   |
|           | 10                 | 28 | 59                           | 45 21 $\frac{3}{4}$ | 56 42 L.                                  | 74 20 30            |                           | 20 27 *               | G.               | Observ. on the Q. Deck.  |
|           | 21                 | 27 | 5                            | 43 15               | Appa. Time 21 <sup>h</sup> 15' 32"        | 21 40               |                           |                       |                  | $\odot$ & $\alpha$ Aquilæ. Pretty<br>good. Quarter Deck.   |
| — 27.     | —                  | —  | —                            | 66 26               |   | 21 25 $\frac{1}{2}$ |                           |                       | 76               | Observ. on the Q. Deck.  |
| — 28.     | —                  | —  | —                            |                     |   | 18 59               |                           |                       | 79               | $\odot$ 's Meridian Altitude.  |
| — 29.     | —                  | —  | —                            |                     |   | 17 32               |                           |                       | 81 $\frac{1}{2}$ | Latitude observed.   |
| — 30.     | —                  | —  | —                            |                     |   | 15 56               |                           |                       | 82               | Ditto.   |
|           | 19                 | 24 | 7                            | 42 43 $\frac{1}{2}$ | 45 36 $\frac{1}{2}$ U.                    | 110 35 20           | 14 28 $\frac{1}{2}$       | 22 35 $\frac{1}{4}$   | G.               | Ditto.   |
|           | 20                 | 6  | 5                            | 32 42 $\frac{1}{2}$ | 36 19 U.                                  | 110 19 00           | 14 25 $\frac{1}{2}$       | 22 50                 | G.               | $\odot$ & $\odot$ . } Very good.   |
|           | 20                 | 58 | 12                           | 44 44 $\frac{3}{4}$ | 24 51 $\frac{1}{2}$ U.                    | 109 56 50           | 14 21                     | 22 47 $\frac{1}{4}$   | G.               | $\odot$ & $\odot$ . }  |
| Octo: 1.  | —                  | —  | —                            |                     |   |                     | 14 6 $\frac{1}{2}$        |                       | 80               | Latitude observed.   |
| — 2.      | —                  | —  | —                            |                     |   |                     | 12 31                     |                       | 81               | Ditto.   |
| — 3.      | —                  | —  | —                            |                     |   |                     | 11 56                     |                       | 80               | Latitude by account.   |
|           | 20                 | 29 | 55                           | 27 7 $\frac{2}{3}$  | 78 57 $\frac{1}{2}$ U.                    | 72 29 00            |                           | 22 48 *               | G.               | $\odot$ & $\odot$ . Clear air.   |
|           | 20                 | 39 | 20                           | 29 22 $\frac{2}{3}$ | Appa. Time 20 <sup>h</sup> 6' 00"         | 11 54               |                           |                       |                  |  |
| — 4.      | —                  | —  | —                            | 73 14               |   | 11 54               |                           |                       | 81               | $\odot$ 's Mer. Alt. Q. Deck.  |
| — 5.      | —                  | —  | —                            | 73 49               |   | 10 55 $\frac{7}{8}$ |                           |                       | 80               | Ditto.   |
| — 6.      | —                  | —  | —                            |                     |   | 9 42                |                           |                       | 81               | Latitude observed.   |
| — 7.      | —                  | —  | —                            |                     |   | 9 42 $\frac{1}{2}$  |                           |                       | 84               | Ditto.   |
| — 8.      | —                  | —  | —                            |                     |   | 8 26                |                           |                       | 81               | Ditto.   |
| — 9.      | —                  | —  | —                            | 75 13 $\frac{1}{2}$ |   | 7 59 $\frac{2}{3}$  |                           |                       | 82               | $\odot$ 's Meridian Altitude.  |
| — 10.     | —                  | —  | —                            |                     |   | 7 42                |                           |                       | 82               | Latitude by account.   |
| — 11.     | —                  | —  | —                            |                     |   | 7 36 $\frac{1}{2}$  |                           |                       | 79               | Latitude observed.   |
| — 12.     | —                  | —  | —                            |                     |   | 7 21                |                           |                       | 80               | Latitude by account.   |
| — 13.     | —                  | —  | —                            |                     |   | 7 2 $\frac{1}{2}$   |                           |                       | 80               | Latitude observed.   |
| — 14.     | —                  | —  | —                            |                     |   | 6 38                |                           |                       | 81               | Latitude by account.   |



# ASTRONOMICAL OBSERVATIONS.

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| 1768.       | Time by the Watch. |                     | Alt. $\odot$ 's<br>L.L. or * | Moon's<br>Altitude.               | Diff. $\odot$ 's L.<br>from $\odot$ or *. | Ship's<br>Latit. N. | Long. W. of<br>Greenwich. | Thermo.          | Obser. | PHENOMENA<br>AND<br>REMARKS.           |
|-------------|--------------------|---------------------|------------------------------|-----------------------------------|---|---------------------|---------------------------|------------------|--------|--|
|             | H                  | "                   |                              |                                   |   |                     |                           |                  |        |  |
| ♀ Octo. 14. | 23                 | 54 43               | 72 24 $\frac{1}{2}$          | 24 28 $\frac{1}{2}$ U.            | 51 35 0                                   | 6 48 $\frac{3}{4}$  | 23 41                     | 82               |        | $\odot$ & $\odot$ . Very good.         |
| ♂ — 15.     | Noon.              |                     | 74 9                         |                                   |   | 6 48 $\frac{3}{4}$  |                           |                  |        | $\odot$ 's Meridian Altitude.          |
|             | 3                  | 53 47 $\frac{2}{3}$ | 35 28 $\frac{1}{2}$          |                                   |   | 6 46                |                           |                  |        | Main Deck.                             |
|             | 4                  | 4 50                | 32 39 $\frac{2}{3}$          | 58 36 U.                          | 52 42 20                                  | 6 46                | 23 21                     |                  | G.     | $\odot$ and $\odot$ . Good.            |
|             | 4                  | 4 50                | 32 39 $\frac{2}{3}$          | 58 36 U.                          | 52 42 30                                  | 6 46                | 23 33 $\frac{1}{2}$       |                  | C.     | $\odot$ and $\odot$ . Good.            |
|             | 4                  | 19 17               | 29 19                        | 58 8 $\frac{2}{3}$ U.             | 52 45 20                                  | 6 45 $\frac{1}{2}$  | 23 18                     |                  | G.     | $\odot$ & $\odot$ . Rath. indistinct.  |
| ♂ — 16.     | 4                  | 21 17 $\frac{1}{2}$ | 28 49 $\frac{1}{2}$          | 58 3 U.                           | 52 45 54                                  | 6 45 $\frac{1}{2}$  |                           |                  | C.     | $\odot$ and $\odot$ .                  |
|             | Noon.              |                     |                              |                                   |   | 5 38                |                           | 80               |        | Latitude by account.                   |
|             | 1                  | 5 25                | 64 31 $\frac{2}{3}$          | 37 23 U.                          | 63 17 20                                  | 5 35                | 23 20                     |                  | G.     | $\odot$ & $\odot$ .                    |
|             | 2                  | 6 1                 | 61 0 $\frac{2}{3}$           | 40 42 $\frac{2}{3}$ U.            | 63 21 50                                  | 5 32                | 23 58                     |                  | G.     | $\odot$ & $\odot$ . V. good. The       |
|             | 2                  | 6 1                 | 61 0 $\frac{2}{3}$           | 40 42 $\frac{2}{3}$ U.            | 63 21 20                                  | 5 32                | 23 46                     |                  | C.     | ist and two last                       |
|             | 2                  | 14 25               | 59 11                        | 42 21 U.                          | 63 24 00                                  | 5 32                | 23 42                     |                  | G.     | by Mr. Green's                         |
|             | 2                  | 14 25               | 59 11                        | 42 21 U.                          | 63 24 00                                  | 5 32                | 23 44                     |                  | C.     | W. the others                          |
|             | 3                  | 42 18               | 28 49 $\frac{1}{2}$          | 59 40 $\frac{2}{3}$ U.            | 63 58 10                                  | 5 31 $\frac{1}{2}$  | 23 38 $\frac{1}{2}$       |                  | G.     | by Cap. Cook's.                        |
|             | 3                  | 48 11               | 27 24 $\frac{1}{2}$          | 59 58 U.                          | 63 58 00                                  | 5 31 $\frac{1}{2}$  | 23 40                     |                  | G.     | On the Poop.                           |
| ♂ — 17.     | Noon.              |                     |                              |                                   |   | 5 17                |                           | 80               |        | $\odot$ & $\odot$ .                    |
|             | 3                  | 33 3                | 34 26 $\frac{1}{2}$          | 52 26 $\frac{1}{2}$ U.            | 75 15 30                                  | 5 15 $\frac{1}{2}$  | 24 32                     |                  | G.     | Latitude observed.                     |
| ♂ — 18.     | Noon.              |                     |                              |                                   |   | 4 45                |                           | 79               |        | $\odot$ and $\odot$ . Dist. Good.      |
| ♀ — 19.     | Noon.              |                     |                              |                                   |   | 3 44                |                           | 80               |        | $\odot$ 's Altitude dubious.           |
|             | 5                  | 12 26               | 16 30                        | 53 25 $\frac{1}{2}$ U.            | 99 21 0                                   |                     | 25 9                      |                  | G.     | Latitude by account.                   |
|             | 5                  | 23 23               | 13 30 $\frac{2}{3}$          | 55 31 $\frac{1}{2}$ U.            | 99 25 0                                   | 3 42                | 25 58                     |                  | G.     | Latitude observed.                     |
|             | 5                  | 41 51               | 9 24                         | 59 20 U.                          | 99 27 0                                   |                     | 25 18 $\frac{2}{3}$       |                  | G.     | $\odot$ & $\odot$ . Pretty good.       |
| ♂ — 20.     | Noon.              |                     | 75 53                        |                                   |   | 3 15 $\frac{1}{2}$  |                           | 81               |        | $\odot$ & $\odot$ . On the Poop.       |
|             | 4                  | 24 27               | 26 24                        | 35 12 U.                          | 111 39 00                                 | 3 7 $\frac{1}{2}$   | 26 10                     |                  | G.     | $\odot$ & $\odot$ . Very good. P.      |
|             | 4                  | 51 54               | 19 44 $\frac{1}{2}$          | 41 29 U.                          | 111 47 30                                 |                     | 26 40                     |                  | G.     | $\odot$ 's Meridian Altitude.          |
|             | 5                  | 9 46                | 17 35 $\frac{1}{2}$          | 43 32 U.                          | 111 50 10                                 |                     | 26 20                     |                  | G.     | $\odot$ & $\odot$ . Very dist. Obs.    |
|             | 5                  | 9 46                | 17 35 $\frac{1}{2}$          | 43 32 U.                          | 111 51 20                                 | 3 6                 | 25 46                     |                  | G.     | on the P. The                          |
|             | 5                  | 18 6                | 15 31 $\frac{1}{2}$          | 45 37 $\frac{2}{3}$ U.            | 111 53 20                                 | 3 6                 | 26 31 $\frac{2}{3}$       |                  | C.     | time for the                           |
|             | 5                  | 18 6                | 15 31 $\frac{1}{2}$          | 45 37 $\frac{2}{3}$ U.            | 111 53 00                                 |                     | 25 46                     |                  | G.     | two first by Mr.                       |
|             | 5                  | 33 39               | 11 37 $\frac{1}{2}$          | 49 9 U.                           | 111 57 30                                 |                     | 26 23 $\frac{1}{2}$       |                  | C.     | Green's Watch                          |
| ♀ — 21.     | Noon.              |                     |                              |                                   |   | 2 49                |                           | 79 $\frac{1}{2}$ |        | the others by                          |
|             | 4                  | 47 45               | 25 8 $\frac{1}{2}$           | 25 45 $\frac{1}{2}$ U.            | 124 38 00                                 |                     | 26 41                     |                  | G.     | Capt. Cook's.                          |
|             | 5                  | 2 32                | 21 44                        | 29 15 $\frac{2}{3}$ U.            | 124 45 20                                 | 2 38 $\frac{2}{3}$  | 26 40                     |                  | G.     | $\odot$ & $\odot$ . Latitude observed. |
|             | 5                  | 25 7                | 16 9                         | 34 40 U.                          | 124 52 30                                 |                     | 26 29 $\frac{1}{2}$       |                  | G.     | $\odot$ & $\odot$ . Dist. good,        |
| ♂ — 22.     | Noon.              |                     |                              |                                   |   | 1 45                |                           | 79               |        | but the hori-                          |
| ♂ — 23.     | Noon.              |                     |                              |                                   |   | 1 40                |                           | 79 $\frac{1}{2}$ |        | zon indistinct.                        |
|             | 3                  | 41 38               | 26 29                        | Appa. Time 4 <sup>h</sup> 9' 18"  |   | 1 39                |                           |                  |        | Latitude observed.                     |
|             | 8                  | 31 44 $\frac{1}{2}$ | 40 52 $\frac{1}{2}$          | 70 3 $\frac{1}{2}$ L.             | 67 29 30                                  |                     |                           |                  |        | Ditto.                                 |
|             | 8                  | 36 4                | 39 44                        | 71 3 L.                           | 67 31 0                                   |                     |                           |                  |        | $\odot$ & $\odot$ . Aquil. Very g. (2) |
|             | 20                 | 50 10               | 46 3 $\frac{2}{3}$           | Appa. Time 21 <sup>h</sup> 12' 3" |   |                     |                           |                  |        | $\odot$ & $\odot$ . Aquil. (1)         |
| ♂ — 24.     | Noon.              |                     | 76 37 $\frac{1}{2}$          |                                   |   | 1 6 $\frac{1}{2}$   |                           | 79 $\frac{1}{2}$ |        | Alt. $\odot$ 's L. L. Bad hori.        |
| ♂ — 25.     | Noon.              |                     | 77 39                        |                                   |   | South.              |                           | 79 $\frac{1}{2}$ |        | $\odot$ 's Merid. Alt. Q. D.           |
| ♀ — 26.     | Noon.              |                     | 78 24                        |                                   |   | 0 15 $\frac{3}{4}$  |                           | 79 $\frac{1}{2}$ |        | Ditto.                                 |
| ♂ — 27.     | Noon.              |                     |                              |                                   |   | 1 21 $\frac{1}{4}$  |                           | 79               |        | Ditto.                                 |
|             |                    |                     |                              |                                   |   | 2 22                |                           | 80 $\frac{1}{4}$ |        | Latitude observed.                     |

## ASTRONOMICAL OBSERVATIONS.

| 1768.       | Time by the Watch. | Alt. $\odot$ 's L. or *. | Moon's Altitude.   | Dist. $\odot$ 's L. from $\odot$ or *. | Ship's Latit. S.    | Long. W. of Greenwich. | Thermo.          | Observ. | PHENOMENA AND REMARKS.                     |
|-------------|--------------------|--------------------------|--|--|---------------------|------------------------|------------------|---------|--|
|             | H                  | "                        | "  | "                                      | "                   | "                      | "                |         |  |
| 24 Octo. 27 | 13 4 37            | 57 28 $\frac{2}{3}$      | 57 4 $\frac{1}{2}$ L.  | 35 43 36                               |                     | 32 27                  |                  | G.      | $\odot$ & A. (5) Very indist.              |
|             | 13 40 43           | 28 41 $\frac{2}{3}$      | 60 34 $\frac{1}{4}$ L.   | 40 6 0                                 |                     | 32 0 $\frac{1}{4}$     |                  | G.      | $\odot$ & P. (4) and the ho-<br>rizon bad. |
|             | 13 51 23           | 31 13                    |  |  | 3 3                 |                        |                  |         |  |
|             | 21 13 59           | 47 39 $\frac{1}{6}$      |  |  | 3 31                |                        |                  |         | $\odot$ 's L. L.                           |
| ♀ — 28.     | Noon.              |                          |  |  | 3 41                |                        | 79               |         | Latitude observed.                         |
| h — 29.     | Noon.              |                          |  |  | 5 24                |                        | 79               |         | Ditto.                                     |
| ⊙ — 30.     | Noon.              |                          |  |  | 7 8                 |                        | 79 $\frac{1}{2}$ |         | Latitude by account.                       |
| h — 31.     | Noon.              |                          |  |  | 8 59                |                        | 80               |         | Latitude observed.                         |
| ♂ Nov. 1.   | Noon.              |                          |  |  | 10 37               |                        | 79 $\frac{1}{2}$ |         | Ditto.                                     |
|             | 14 56 12           | 56 14                    | 27 8 $\frac{2}{3}$ L.  | 72 58 20                               | 11 54 $\frac{1}{2}$ | 32 11                  |                  | G.      | $\odot$ & Aldebaran.                       |
|             | 16 16 16           | 48 10 $\frac{1}{3}$      | 43 43 $\frac{1}{2}$ L.   | 31 43 20                               | 12 5 $\frac{1}{2}$  | 31 25                  |                  | G.      | ( * 's Alt. bad.) Pret.                    |
|             | 16 58 32           | 35 8 $\frac{1}{2}$       | 52 59 L.   | 73 43 0                                | 12 9 $\frac{1}{2}$  | 32 19                  |                  | G.      | $\odot$ & Pollux. } good                   |
|             | 20 29 6            | 39 49                    | 56 40 $\frac{2}{3}$ U.   | 78 46 00                               | 12 29 $\frac{1}{2}$ | 32 40                  |                  | G.      | $\odot$ & Aldeb. (2) }                     |
|             | 20 57 19           | 46 42                    | 51 27 $\frac{1}{2}$ U.   | 78 37 10                               | 12 32               | 32 40 $\frac{1}{2}$    |                  | G.      | $\odot$ & $\odot$ . } Air but indiff.      |
| ♀ — 2.      | Noon.              | 87 34 $\frac{5}{6}$      |  |  | 12 50               |                        | 80 $\frac{1}{2}$ |         | $\odot$ & $\odot$ . } Bad horizon.         |
|             | 19 30 37           | 48 34                    | 61 7 $\frac{1}{2}$ U.  | 67 0 20                                | 14 26               | 32 50                  |                  | G.      | $\odot$ 's Meridian Altitude.              |
| 24 — 3.     | Noon.              | 89 17                    |  |  | 14 51               |                        | 80               |         | $\odot$ and $\odot$ . Very clear.          |
|             | 22 34 22           | 58 25 $\frac{1}{3}$      | 63 14 $\frac{2}{3}$ U.   | 55 27 30                               | 16 41 $\frac{1}{2}$ | 34 30                  |                  | G.      | $\odot$ 's Meridian Altitude.              |
| ♀ — 4.      | Noon.              | 88 39 $\frac{1}{2}$      |  |  | 16 49               |                        | 78 $\frac{1}{2}$ |         | $\odot$ & $\odot$ . Obj. very dist.        |
|             | 20 58 47           | 46 26                    | 75 57 U.   | 44 30 30                               | 18 12 $\frac{2}{3}$ | 34 26 $\frac{1}{2}$    |                  | G.      | $\odot$ 's Merid. Alt. Poop.               |
| h — 5.      | Noon.              | 87 24 $\frac{1}{2}$      |  |  | 18 22 $\frac{1}{4}$ |                        | 78               |         | $\odot$ and $\odot$ . (1) Cloudy.          |
| ⊙ — 6.      | Noon.              | 87 3                     |  |  | 19 1 $\frac{3}{4}$  |                        | 77               |         | $\odot$ 's Meridian Altitude.              |
| h — 7.      | Noon.              | 86 37                    |  |  | 19 45 $\frac{1}{2}$ |                        | 77               |         | Ditto.                                     |
| ♂ — 8.      | Noon.              |                          |  |  | 21 15               |                        | 77               |         | Ditto.                                     |
| ♀ — 9.      | Noon.              |                          |  |  | 21 30               |                        | 74               |         | Latitude observed.                         |
| 24 — 10.    | Noon.              |                          |  |  | 21 30               |                        | 75               |         | Ditto.                                     |
| ♀ — 11.     | Noon.              |                          |  |  | 22 37               |                        | 72 $\frac{1}{2}$ |         | Ditto.                                     |
| h — 12.     | Noon.              |                          |  |  | 23 6                |                        | 72               |         | Ditto.                                     |
|             | 3 33 25            | 41 47                    |  | 33 58 40                               |                     | 43 25 $\frac{7}{8}$ *  |                  | G.      | $\odot$ & $\odot$ . } Inentr.              |
|             | 3 46 50            | 38 43 $\frac{1}{2}$      |  | 34 0 40                                | 23 2 $\frac{1}{3}$  | 42 43 $\frac{1}{4}$ *  |                  | G.      | $\odot$ & $\odot$ . } of the               |
|             | 3 54 8             | 37 3 $\frac{2}{3}$       |  | 34 2 30                                |                     | 42 44 $\frac{1}{8}$ *  |                  | G.      | $\odot$ & $\odot$ . } Harb.                |
|             |                    | 6 2                      | Mag. Azi. $\odot$ 's Cent. S. 65° 48' W. Var. of the Compass 7° 11' E. |  |                     |                        |                  |         |  |
| 24 Dec. 8.  | Noon.              | 88 17                    |  |  | 24 21 $\frac{2}{3}$ |                        | 78               |         | $\odot$ 's Merid. Alt. Q.D.                |
| ♀ — 9.      | Noon.              | 87 58 $\frac{1}{2}$      |  |  | 24 46 $\frac{1}{3}$ |                        | 78 $\frac{1}{2}$ |         | Ditto. Poop.                               |
| h — 10.     | Noon.              | 87 15 $\frac{1}{2}$      |  |  | 25 34 $\frac{1}{3}$ |                        | 75 $\frac{1}{2}$ |         | Ditto.                                     |
| ⊙ — 11.     | Noon.              | 87 11 $\frac{1}{2}$      |  |  | 25 42 $\frac{2}{3}$ |                        | 75               |         | Ditto.                                     |
| h — 12.     | Noon.              | 86 44                    |  |  | 26 14 $\frac{2}{3}$ |                        | 74               |         | Ditto.                                     |
|             | 4 34 41            | 28 7 $\frac{1}{3}$       | 62 47 L.   | 38 13 20                               | 26 27 $\frac{1}{2}$ | 42 43 $\frac{1}{2}$    |                  | G.      | $\odot$ & $\odot$ . } Obf. on M. D.        |
|             | 4 47 6             | 25 22 $\frac{2}{3}$      | 60 20 L.   | 38 16 57                               | 26 28 $\frac{3}{8}$ | 42 36                  |                  | G.      | $\odot$ & $\odot$ . } Objects faint,       |
|             | 5 1 14             | 22 25 $\frac{1}{2}$      |  |  | 26 29 $\frac{3}{8}$ |                        |                  |         | $\odot$ 's Al. } air clear, and            |
| ♂ — 13.     | Noon.              | 19 24                    | 54 14 $\frac{1}{2}$ L.   | 38 26 50                               | 26 30 $\frac{1}{4}$ | 42 37 $\frac{1}{2}$    |                  | G.      | $\odot$ & $\odot$ . } horizon good.        |
| ♀ — 14.     | Noon.              | 85 2                     |  |  | 28 0 $\frac{1}{2}$  |                        | 75               |         | $\odot$ 's Meridian Altitude.              |
| 24 — 15.    | Noon.              | Cloudy                   |  |  |                     |                        | 73               |         | Latitude by account.                       |
|             |                    | 83 1                     |  |  | 30 8                |                        | 72               |         | $\odot$ 's Meridian Altitude.              |

# ASTRONOMICAL OBSERVATIONS.

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| 1768.       | Time by the Watch.     |   | Alt. of $\odot$ 's L.L. or * | Moon's Altitude.                  | Dist. $\odot$ 's L. from $\odot$ or *. | Ship's Latit. S.    | Long. W. of Greenwich. | Thermo.          | Observ. | PHENOMENA AND REMARKS.                                   |
|-------------|------------------------|---|------------------------------|-----------------------------------|--|---------------------|------------------------|------------------|---------|--|
|             | H                      | " |                              |                                   |  |                     |                        |                  |         |  |
| 24 Dec. 15. | 1 40 9                 |   | 65 47                        | 37 18 $\frac{1}{4}$ U.            | 73 57 10                               | 30 11               | 42 25                  |                  | G.      | $\odot$ & $\odot$ .                                      |
|             | 3 24 40                |   | 43 27                        | 55 39 $\frac{1}{2}$ U.            | 74 35 0                                | 30 14 $\frac{1}{2}$ | 42 33 $\frac{1}{2}$    |                  | G.      | $\odot$ & $\odot$ .                                      |
|             | 3 41 14                |   | 39 57                        | 57 53 U.                          | 74 40 50                               | 30 14 $\frac{1}{2}$ | 42 38 $\frac{1}{2}$    |                  | G.      | $\odot$ & $\odot$ . Pretty good.                         |
|             | 3 55 32                |   | 36 49                        | 59 25 $\frac{1}{2}$ U.            | 74 46 30                               | 30 15               | 42 38                  |                  | G.      | $\odot$ & $\odot$ . Observed on the Poop.                |
|             | 4 3 6                  |   | 35 25 $\frac{1}{2}$          | 60 13 $\frac{2}{3}$ U.            | 74 48 10                               | 30 15               | 42 33 $\frac{1}{4}$    |                  | G.      | $\odot$ & $\odot$ .                                      |
|             | 4 9 15                 |   | 33 35 $\frac{1}{2}$          |                                   |  | 30 15 $\frac{1}{4}$ |                        |                  | G.      | $\odot$ 's AL.   |
| ♀ — 16.     | Noon.                  |   | 81 50                        |                                   |  | 31 21 $\frac{1}{2}$ |                        | 72               | G.      | $\odot$ 's Meridian Altitude.                            |
| ♂ — 17.     | Noon.                  |   | 80 58                        |                                   |  | 32 15 $\frac{1}{4}$ |                        | 71               | G.      | Ditto.   |
|             | 3 9 2                  |   | 48 4 $\frac{1}{2}$           | 26 31 $\frac{2}{3}$ U.            | 100 10 53                              | 32 22 $\frac{2}{3}$ | 43 59 $\frac{1}{2}$ *  |                  | G.      | $\odot$ & $\odot$ .                                      |
|             | 3 21 49                |   | 45 17                        | 28 44 $\frac{1}{2}$ U.            | 100 16 40                              | 32 22 $\frac{5}{8}$ | 44 00 $\frac{1}{2}$ *  |                  | G.      | $\odot$ & $\odot$ .                                      |
|             | 3 30 27                |   | 43 40                        | Appa. Time 3 <sup>h</sup> 26' 55" |  | 32 23 $\frac{1}{2}$ |                        |                  | G.      | $\odot$ & $\odot$ . Clear air, and good horizon.         |
|             | 3 43 3                 |   | 41 2 $\frac{2}{3}$           | 32 18 U.                          | 100 25 30                              | 32 23 $\frac{3}{8}$ | 43 59 $\frac{1}{2}$ *  |                  | G.      | $\odot$ & $\odot$ .                                      |
|             | 3 51 13                |   | 39 23                        | 33 36 U.                          | 100 30 50                              | 32 24               | 44 54 *                |                  | G.      | $\odot$ & $\odot$ .                                      |
|             | 4 6 40                 |   | 35 55 $\frac{2}{3}$          | 36 5 $\frac{2}{3}$ U.             | 100 37 00                              | 32 24 $\frac{1}{2}$ | 44 47 *                |                  | G.      | $\odot$ & $\odot$ .                                      |
|             | 8 47 2                 |   | 34 28 $\frac{1}{2}$          | 38 40 L.                          | 57 19 10                               | 32 33 $\frac{1}{4}$ | 43 56 *                |                  | G.      | $\odot$ & Ald. Clear air, and good horizon.              |
|             | 9 0 31                 |   | 35 57 $\frac{1}{2}$          | 36 49 L.                          | 57 12 0                                | 32 33 $\frac{1}{2}$ | 43 16                  |                  | G.      | $\odot$ & Ald.   |
|             | 9 16 29                |   | 37 30                        | 34 21 $\frac{1}{2}$ L.            | 57 5 30                                | 32 33 $\frac{3}{4}$ | 43 19 $\frac{1}{4}$    |                  | G.      | $\odot$ & Ald.   |
| ○ — 18.     | Noon.                  |   | 80 33                        |                                   |  | 32 41 $\frac{1}{4}$ |                        | 68               | G.      | $\odot$ 's Meridian Altitude.                            |
|             | 3 57 57                |   | 38 0 $\frac{2}{3}$           | 22 7 $\frac{2}{3}$ U.             | 113 49 10                              |                     | 44 30                  |                  | G.      | $\odot$ & $\odot$ .                                      |
|             | 4 9 50                 |   | 35 31 $\frac{2}{3}$          | 24 1 $\frac{2}{3}$ U.             | 113 55 30                              | 32 47 $\frac{3}{4}$ | 44 28                  |                  | G.      | $\odot$ & $\odot$ . Very clear and distinct.             |
|             | 4 19 38                |   | 33 28                        | 25 37 $\frac{1}{2}$ U.            | 113 59 0                               |                     | 44 39                  |                  | G.      | $\odot$ & $\odot$ .                                      |
| ♂ — 19.     | Noon.                  |   | 79 11 $\frac{1}{2}$          |                                   |  | 34 4 $\frac{1}{4}$  |                        | 69               | G.      | $\odot$ 's Meridian Altitude.                            |
| ♂ — 20.     | Noon.                  |   |                              |                                   |  | 36 2                |                        | 70               | G.      | Latitude by account.                                     |
| ♀ — 21.     | Noon.                  |   | 76 9                         |                                   |  | 37 7 $\frac{1}{2}$  |                        | 72               | G.      | $\odot$ 's Meridian Altitude.                            |
| ♂ — 22.     | Noon.                  |   | 76 8                         |                                   |  | 37 8                |                        | 77               | G.      | Ditto.   |
| ♀ — 23.     | Noon.                  |   | 76 29                        |                                   |  | 36 46 $\frac{3}{8}$ |                        | 69               | G.      | Ditto.   |
| ♂ — 24.     | Noon.                  |   | 76 3                         |                                   |  | 37 10 $\frac{3}{4}$ |                        | 68               | G.      | Ditto.   |
| ○ — 25.     | Noon.                  |   |                              |                                   |  | 38 37               |                        | 70               | G.      | Latitude by account.                                     |
| ♂ — 26.     | Noon.                  |   |                              |                                   |  | 40 19               |                        | 69               | G.      | Ditto.   |
| ♂ — 27.     | Noon.                  |   |                              |                                   |  | 41 38               |                        | 68               | G.      | Ditto.   |
| ♀ — 28.     | Noon.                  |   | 72 16                        |                                   |  | 40 47 $\frac{1}{2}$ |                        | 67 $\frac{1}{2}$ | G.      | $\odot$ 's Merid. Alt. Poop.                             |
|             | 19 58 27               |   | 35 33 $\frac{1}{2}$          | 31 54 $\frac{1}{2}$ U.            | 106 33 00                              | 41 26 $\frac{1}{2}$ | 59 8                   |                  | G.      | $\odot$ & $\odot$ .                                      |
|             | 20 6 47                |   | 37 10 $\frac{1}{2}$          | 30 32 $\frac{2}{3}$ U.            | 106 29 30                              | 41 26 $\frac{2}{3}$ | 59 21                  |                  | G.      | $\odot$ & $\odot$ .                                      |
|             | 20 15 52               |   | 38 50                        | 29 6 U.                           | 106 26 10                              | 41 27               | 59 17                  |                  | G.      | $\odot$ & $\odot$ .                                      |
|             | 21 31 7 $\frac{1}{2}$  |   | 52 36 $\frac{1}{2}$          | 16 20 U.                          | 105 55 30                              | 41 33 $\frac{1}{4}$ | 59 34                  |                  | C.      | $\odot$ & $\odot$ . Observed on the Q. Deck.             |
|             | 21 32 20               |   | 52 48 $\frac{2}{3}$          | 16 6 U.                           | 105 55 50                              | 41 33 $\frac{1}{4}$ | 59 12                  |                  | G.      | $\odot$ & $\odot$ . Very good.                           |
|             | 21 41 47               |   | 54 27 $\frac{2}{3}$          | 14 28 $\frac{1}{2}$ U.            | 105 52 00                              | 41 34               | 59 17 $\frac{1}{2}$    |                  | G.      | $\odot$ & $\odot$ .                                      |
|             | 21 41 47               |   | 54 27 $\frac{2}{3}$          | 14 28 $\frac{1}{2}$ U.            | 105 51 10                              | 41 34               | 59 11 $\frac{3}{4}$    |                  | C.      | $\odot$ & $\odot$ .                                      |
|             | 21 52 13               |   | 56 15                        | 12 40 $\frac{2}{3}$ U.            | 105 46 30                              | 41 34 $\frac{3}{4}$ | 59 43                  |                  | G.      | $\odot$ & $\odot$ .                                      |
|             | 21 52 13               |   | 56 15                        | 12 40 $\frac{2}{3}$ U.            | 105 46 10                              | 41 34 $\frac{3}{4}$ | 59 20 $\frac{3}{4}$    |                  | C.      | $\odot$ & $\odot$ .                                      |
| ♂ — 29.     | Noon.                  |   | 71 16                        |                                   |  | 41 44               |                        | 67               | G.      | $\odot$ 's Merid. Alt. Poop.                             |
| ♀ — 30.     | Noon.                  |   | 70 24                        |                                   |  | 42 31 $\frac{1}{2}$ |                        | 66               | G.      | Ditto. Do.   |
| ♂ — 31.     | Noon.                  |   |                              |                                   |  | 43 14               |                        | 65               | G.      | Latitude by account.                                     |
|             | 21 47 00               |   | 54 26 $\frac{2}{3}$          | 44 13 $\frac{2}{3}$ U.            | 72 28 00                               | 43 34               | 61 18 $\frac{1}{2}$    |                  | G.      | $\odot$ & $\odot$ . Observed on the Poop. The air clear. |
|             | 21 47 00               |   | 54 26 $\frac{2}{3}$          | 44 13 $\frac{2}{3}$ U.            | 72 26 00                               | 43 34               |                        |                  | C.      | $\odot$ & $\odot$ .                                      |
|             | 21 56 22 $\frac{1}{2}$ |   | 56 5                         | 42 44 $\frac{1}{2}$ U.            | 72 23 00                               | 43 35               |                        |                  | C.      | $\odot$ & $\odot$ .                                      |

## ASTRONOMICAL OBSERVATIONS.

| 1768.                  | Time by the Watch. | Alt. $\odot$ 's<br>L.L. or * | Moon's<br>Altitude.    | Dist. $\odot$ 's L.<br>from $\odot$ or * | Ship's<br>Latit. S. | Long. W. of<br>Greenwich. | Thermo. | Observ. | PHENOMENA<br>AND<br>REMARKS.              |
|------------------------|--------------------|------------------------------|------------------------|--|---------------------|---------------------------|---------|---------|---|
|                        | H ' "              | ° ' "                        | ° ' "                  | ° ' "                                    | ° ' "               | ° ' "                     |         |         |   |
| $\frac{1}{2}$ Dec. 31. | 21 57 47           | 56 17 $\frac{1}{4}$          | 42 30 $\frac{2}{3}$ U. | 72 23 27                                 | 43 35               | 61 9 $\frac{1}{2}$        |         | G.      | $\odot$ & $\odot$ .                       |
|                        | 22 6 12            | 57 59                        | 40 38 $\frac{1}{3}$ U. | 72 20 20                                 | 43 36               | 61 6                      |         | G.      | $\odot$ & $\odot$ .                       |
|                        | 22 6 12            | 57 59                        | 40 38 $\frac{1}{3}$ U. | 72 20 00                                 | 43 36               |                           |         | C.      | $\odot$ & $\odot$ .                       |
|                        | 22 17 32           | 59 47 $\frac{5}{8}$          | 38 43 $\frac{1}{3}$ U. | 72 16 50                                 | 43 37 $\frac{1}{4}$ | 61 6                      |         | G.      | Observ. on the<br>Poop. The<br>air clear. |
|                        | 22 28 10           | 61 24 $\frac{5}{8}$          | 36 58 U.               | 72 13 20                                 | 43 38 $\frac{1}{2}$ | 61 15 $\frac{1}{2}$       |         | G.      | $\odot$ & $\odot$ .                       |
|                        |                    | 63 10                        | 34 39 U.               | 72 8 0                                   | 43 39 $\frac{1}{2}$ | 61 13                     |         | G.      | $\odot$ & $\odot$ .                       |
| 1769.                  |                    |                              |                        |  |                     |                           |         |         |   |
| $\odot$ Jan. 1.        | Neon               | 69 00                        |                        |  | 43 45 $\frac{3}{4}$ |                           | 62      | G.      | $\odot$ 's Meridian Altitude.             |
|                        | 21 23 28           | 56 49 $\frac{5}{8}$          | 49 54 U.               | 61 24 40                                 | 45 7 $\frac{1}{3}$  | 61 10                     |         | G.      | $\odot$ & $\odot$ .                       |
|                        | 21 43 57           | 59 48 $\frac{1}{2}$          | 46 44 U.               | 61 19 00                                 | 45 9 $\frac{1}{3}$  | 61 16                     |         | G.      | $\odot$ & $\odot$ . (5) { Good air.       |
|                        | 22 0 30            | 61 53 $\frac{1}{2}$          | 44 5 U.                | 61 13 0                                  | 45 10 $\frac{1}{3}$ | 61 13                     |         | G.      | Good obsf.<br>On the P.                   |
| $\odot$ — 2.           | Neon               | 67 23                        |                        |  | 45 17 $\frac{1}{4}$ |                           | 64      | G.      | $\odot$ 's Meridian Altitude.             |
|                        | 21 27 18           | 48 47 $\frac{1}{3}$          | 62 7 U.                | 50 40 40                                 |                     | 61 29                     |         | G.      | $\odot$ & $\odot$ .                       |
|                        | 21 39 31           | 50 41                        | 61 3 $\frac{1}{2}$ U.  | 50 36 50                                 | 47 5 $\frac{1}{2}$  | 61 16                     |         | G.      | Very clear.                               |
|                        | 21 49 40           | 52 12 $\frac{2}{3}$          | 60 12 $\frac{1}{3}$ U. | 50 33 30                                 |                     | 61 35                     |         | G.      | On the Poop.                              |
| $\odot$ — 3.           | Neon.              | 65 17                        |                        |  | 47 17               |                           | 64      |         | $\odot$ 's Merid. Alt.                    |
| $\odot$ — 4.           | Neon.              | 63 59                        |                        |  | 48 28 $\frac{3}{4}$ |                           | 57      |         | Ditto. } Q.D.                             |
| $\odot$ — 5.           | Neon.              | 62 32                        |                        |  | 49 48 $\frac{1}{4}$ |                           | 63      |         | Ditto. }                                  |
| $\odot$ — 6.           | Neon.              |                              |                        |  | 51 20               |                           | 60      |         | Latitude by account.                      |
| $\odot$ — 7.           | Neon.              | 60 40                        |                        |  | 51 26               |                           | 57      |         | $\odot$ 's Merid. Alt.                    |
| $\odot$ — 8.           | Neon.              | 60 40                        |                        |  | 51 17 $\frac{1}{3}$ |                           | 58      |         | Ditto.                                    |
| $\odot$ — 9.           | Neon.              | 59 25 $\frac{1}{2}$          |                        |  | 51 23 $\frac{1}{3}$ |                           | 57      |         | Ditto.                                    |
| $\odot$ — 10.          | Neon.              | 58 47                        |                        |  | 52 52 $\frac{2}{3}$ |                           | 56      |         | Ditto.                                    |
| $\odot$ — 11.          | Neon.              | 57 10 $\frac{1}{2}$          |                        |  | 54 19 $\frac{2}{3}$ |                           | 57      |         | Ditto.                                    |
| $\odot$ — 12.          | Neon.              | 56 47                        |                        |  | 54 33               |                           | 52      |         | Ditto.                                    |
| $\odot$ — 13.          | Neon.              | 56 28                        |                        |  | 54 41 $\frac{1}{4}$ |                           | 54      |         | C. St. Diego No<br>dist. 2 leagues.       |
|                        | 6 12 53            | 15 14 $\frac{1}{3}$          | 24 7 U.                | 71 27 40                                 |                     | 66 9 $\frac{3}{4}$ *      |         | G.      | Very clear,<br>but a turb. sea.           |
|                        | 6 18 41            | 14 26                        | 23 41 $\frac{1}{3}$ U. | 71 30 30                                 | 54 22 $\frac{3}{4}$ | 66 17 $\frac{1}{8}$ *     |         | G.      | Cape St. Diego                            |
|                        | 6 24 26            | 13 38                        | 23 18 $\frac{1}{3}$ U. | 71 32 10                                 |                     | 66 00 *                   |         | G.      | S. by E. true,<br>dist. 4 or 5 lea.       |
| $\frac{1}{2}$ — 21.    | Neon.              | 54 11                        |                        |  | 55 21 $\frac{1}{2}$ |                           | 48      |         | Q.D. †                                    |
| $\odot$ — 22.          | Neon.              | 53 12                        |                        |  | 56 6 $\frac{3}{4}$  |                           | 50      |         | $\odot$ 's Merid. Altitude.               |

† Capt. Cook has computed these three observations; and, contrary to his constant practice in every other instance, has put down both the results and the observations. He has also put down the apparent times at the ship, as he computed them; but he has not put down the latitude he made use of, which would have been of great use here, as the variety of currents which the ship was affected by, prevents us from determining this point, now, with so much exactness as he could, who had the land before him for a guide. His apparent times uniformly exceed mine by 9", which must have arisen from his taking the latitude somewhat greater than I have: for it is not likely that we should differ much in the sun's declination at this time of the year. Captain Cook's results are  $66^{\circ} 7\frac{1}{4}$  west,  $66^{\circ} 19\frac{1}{4}$  west, and  $66^{\circ} 00\frac{1}{4}$  west. Mr. Green makes them  $66^{\circ} 7\frac{1}{4}$  west,  $66^{\circ} 19\frac{1}{4}$  west, and  $66^{\circ} 3\frac{1}{4}$  west. In deducing those which are put down in the proper column, I have reduced the distance in the most rigid manner, by spherical Trigonometry; but if I had made use of Captain Cook's apparent times at the ship, each result would have been less than it is by 2' 15".

# ASTRONOMICAL OBSERVATIONS.

23

| 1769.      | Time by the Watch. | Alt. $\odot$ 's<br>L.L. or * | Moon's<br>Altitude.    | Dist. $\odot$ 's L.<br>from $\odot$ or * | Ship's<br>Latit. S. | Long. W. of<br>Greenwich. | Thermo.          | Obsev. | PHENOMENA<br>AND<br>REMARKS.                    |
|------------|--------------------|------------------------------|------------------------|--|---------------------|---------------------------|------------------|--------|---|
|            | H. ' "             | ° ' "                        | ° ' "                  | ° ' "                                    | ° ' "               | ° ' "                     |                  |        |   |
| D Jan. 23. | Noon.              | 53 40                        |                        |  | 55 24 $\frac{1}{2}$ |                           | 53               |        | Ditto.  |
| ♂ — 24.    | Noon.              | 53 12                        |                        |  | 55 37 $\frac{1}{4}$ |                           | 56               |        | Ditto.  |
| ♀ — 25.    | Noon.              |                              |                        |  | 55 57               |                           | 52               |        | Latitude by account.                            |
| 24 — 26.   | Noon.              |                              |                        |  | 56 57               |                           | 56               |        | Ditto.  |
|            | 11 59 57           | 18 1                         | 23 13 $\frac{2}{3}$ U. | 42 14 30                                 |                     | 67 2 $\frac{1}{4}$ *      |                  | G.     | $\odot$ & Regul. Uncert. P.                     |
|            | 18 54 19           | 20 50 $\frac{2}{3}$          | 31 33 L.               | 116 3 30                                 |                     | 66 1 $\frac{1}{2}$ *      |                  | G.     | $\odot$ & $\odot$ . { But indif. The            |
|            | 19 0 43            | 21 41                        | 30 51 $\frac{1}{2}$ L. | 115 59 20                                | 57 11 $\frac{1}{4}$ | 67 0 *                    |                  | G.     | $\odot$ & $\odot$ . { ship E. of Cape           |
|            | 19 6 38            | 22 28                        | 30 16 L.               | 115 57 00                                |                     | 67 5 $\frac{1}{4}$ *      |                  | G.     | $\odot$ & $\odot$ . { Horn, in long.            |
|            |                    |                              |                        |  |                     |                           |                  |        | $\odot$ & $\odot$ . { 27°, 9. Poop.             |
| ♀ — 27.    | Noon.              | 51 0 $\frac{1}{2}$           |                        |  | 57 3 $\frac{1}{2}$  |                           | 56               |        | $\odot$ 's Merid. Alt. Obs.<br>on the Poop. †   |
|            | 21 33 5            | 41 50 $\frac{2}{3}$          | 20 15 L.               | 103 42 30                                |                     | 69 6 $\frac{1}{4}$ *      |                  | G.     | $\odot$ & $\odot$ . { Pretty clear.             |
|            | 21 55 8            | 44 0 $\frac{1}{3}$           | 17 35 L.               | 103 33 40                                | 58 1                | 68 33 $\frac{1}{4}$ *     |                  | G.     | $\odot$ & $\odot$ . { The ship W.               |
|            | 22 3 12            | 44 36                        | 16 36 $\frac{1}{2}$ L. | 103 29 40                                |                     | 69 3 $\frac{1}{4}$ *      |                  | G.     | $\odot$ & $\odot$ . { of Cape Horn,             |
| h — 28.    | Noon.              | 49 44                        |                        |  | 58 4                |                           | 56               |        | $\odot$ 's Merid. Altitude.                     |
|            | 22 7 48            | 44 38                        | 23 47 $\frac{1}{3}$ U. | 92 25 00                                 |                     | 71 14 *                   |                  | G.     | $\odot$ & $\odot$ . { Pretty good.              |
|            | 22 17 27           | 45 12 $\frac{2}{3}$          | 22 33 $\frac{1}{3}$ U. | 92 20 20                                 | 58 54 $\frac{2}{3}$ | 71 56 *                   |                  | G.     | $\odot$ & $\odot$ . { Ship W. of C.             |
|            | 22 24 33           | 45 43 $\frac{1}{2}$          | 21 43 U.               | 92 17 0                                  |                     | 72 0 $\frac{1}{4}$ *      |                  | G.     | $\odot$ & $\odot$ . { Horn, in lon.             |
| ○ — 29.    | Noon.              | 48 32                        |                        |  | 58 59 $\frac{2}{3}$ |                           | 50               |        | $\odot$ & $\odot$ . (2) { 4° 27'. Q. D.         |
|            |                    |                              |                        |  |                     |                           |                  |        | $\odot$ 's Merid. Altitude.                     |
|            | 22 43 29           | 44 56 $\frac{1}{3}$          | 29 4 L.                | 81 18 40                                 |                     | 73 24 *                   |                  | G.     | $\odot$ & $\odot$ . { Very clear.               |
|            | 22 49 10           | 45 15                        | 28 26 $\frac{1}{3}$ L. | 81 16 40                                 | 60 2                | 73 14 *                   |                  | G.     | $\odot$ & $\odot$ . { The ship W.               |
|            | 22 53 28           | 45 29                        | 27 55 L.               | 81 14 30                                 |                     | 73 23 $\frac{3}{4}$ *     |                  | G.     | $\odot$ & $\odot$ . { of Cape Horn,             |
|            |                    |                              |                        |  |                     |                           |                  |        | $\odot$ & $\odot$ . { in long. 5° 51'.<br>M. D. |
| D — 30.    | Noon.              | 47 11                        |                        |  | 60 4 $\frac{1}{2}$  |                           | 56               |        | $\odot$ 's Merid. Altitude.                     |
| ♂ — 31.    | Noon.              | 47 10                        |                        |  | 59 48 $\frac{1}{3}$ |                           | 58               |        | Ditto.  |
| ♀ Feb. 1.  | Noon.              | 47 57                        |                        |  | 58 44               |                           | 61               |        | Ditto.  |
| 24 — 2.    | Noon.              |                              |                        |  | 58 30               |                           | 64               |        | Latitude by account.                            |
| ♀ — 3.     | Noon.              |                              |                        |  | 58 30               |                           | 65               |        | Ditto.  |
| h — 4.     | Noon.              | 48 1                         |                        |  | 57 46 $\frac{2}{3}$ |                           | 66               |        | $\odot$ 's Merid. Altitude.                     |
| ○ — 5.     | Noon.              |                              |                        |  | 56 46               |                           | 66               |        | Latitude by account.                            |
| D — 6.     | Noon.              | 50 13                        |                        |  | 55 17 $\frac{2}{3}$ |                           | 66 $\frac{1}{2}$ |        | $\odot$ 's Merid. Altitude.                     |
| ♂ — 7.     | Noon.              |                              |                        |  | 54 40               |                           | 52               |        | Latitude by account.                            |
| ♀ — 8.     | Noon.              | 50 51                        |                        |  | 53 41 $\frac{2}{3}$ |                           | 55               |        | $\odot$ 's Meridian Altitude.                   |
| 24 — 9.    | Noon.              |                              |                        |  | 52 22               |                           | 56               |        | Latitude observed.                              |
| ♀ — 10.    | Noon.              |                              |                        |  | 51 16               |                           | 55               |        | Latitude by account.                            |
| h — 11.    | Noon.              |                              |                        |  | 50 55               |                           | 57               |        | Ditto.  |
|            | 4 19 35            | 22 49 $\frac{2}{3}$          | 22 19 U.               | 67 5 30                                  | 50 33 $\frac{1}{2}$ | 89 7                      |                  | G.     | $\odot$ & $\odot$ . { Very good.                |
|            | 4 19 35            | 22 49 $\frac{2}{3}$          | 22 19 U.               | 67 7 50                                  |                     |                           |                  | C.     | $\odot$ & $\odot$ . { Mr. Green re-             |
|            | 4 37 42            | 19 47                        | 21 41 $\frac{1}{3}$ U. | 67 16 00                                 |                     | 89 6 $\frac{1}{4}$        |                  | G.     | $\odot$ & $\odot$ . { marks that the            |
|            | 4 37 42            | 19 47                        | 21 41 $\frac{1}{3}$ U. | 67 16 10                                 |                     |                           |                  | C.     | $\odot$ & $\odot$ . { numbers were              |
|            | 4 44 52            | 18 41 $\frac{2}{3}$          | 21 24 U.               | 67 18 30                                 |                     | 89 7                      |                  | G.     | $\odot$ & $\odot$ . { read off from             |
|            | 4 44 52            | 18 41 $\frac{2}{3}$          | 21 24 U.               | 67 17 50                                 |                     |                           |                  | C.     | $\odot$ & $\odot$ . { his quadrant              |
|            |                    |                              |                        |  |                     |                           |                  |        | $\odot$ & $\odot$ . { by Capt. Cook.            |
|            |                    |                              |                        |  |                     |                           |                  |        | $\odot$ & $\odot$ . { Obs. on M. D.             |

† At 2<sup>h</sup> 0' 00", they saw the Island of Diego Ramiriz bearing north true, distant about 8 leagues. They had made a W. N. W. course good from the time when the observations were taken in the morning to this; and had run 33 $\frac{1}{2}$  miles, of which, 11 had been run since noon. Hence the latitude of Diego Ramiriz is 56° 35' South, and its longitude west of Cape Horn 28° 54'.



## ASTRONOMICAL OBSERVATIONS.

| 1769.      | Time by the Watch. | Alt. ☉'s L.L.or*    | Moon's Altitude.       | Diff. ☉'s L. from ☉ or *. | Ship's Latit. S.    | Long. W. of Greenwich. | Thermo.          | Observ. | PHENOMENA AND REMARKS. |
|------------|--------------------|---------------------|------------------------|---------------------------|---------------------|------------------------|------------------|---------|------------------------|
| H          | "                  | °                   | '                      | "                         | °                   | '                      |                  |         |                        |
| Feb. 11.   | 4 52 50            | 17 25               | 20 59 $\frac{2}{3}$ U. | 67 19 50                  | 50 33 $\frac{1}{2}$ | 89 8                   |                  | G.      | ☉ & ☉.                 |
|            | 4 52 50            | 17 25               | 20 59 $\frac{2}{3}$ U. | 67 19 50                  | 50 33 $\frac{1}{2}$ |                        |                  | C.      | ☉ & ☉.                 |
|            | 4 56 37            | 16 47 $\frac{2}{3}$ | 20 48 $\frac{2}{3}$ U. | 67 21 50                  |                     | 89 17                  |                  | G.      | ☉ & ☉.                 |
|            | 4 56 37            | 16 47 $\frac{2}{3}$ | 20 48 $\frac{2}{3}$ U. | 67 22 30                  |                     |                        |                  | C.      | ☉ & ☉.                 |
|            | 5 0 39             | 16 9                | 20 37 $\frac{1}{3}$ U. | 67 22 40                  |                     |                        |                  | G.      | ☉ & ☉.                 |
|            | 5 0 39             | 16 9                | 20 37 $\frac{1}{3}$ U. | 67 24 0                   |                     |                        |                  | C.      | ☉ & ☉.                 |
|            | 5 4 18             | 15 35 $\frac{1}{3}$ | 20 26 U.               | 67 24 0                   |                     |                        |                  | G.      | ☉ & ☉.                 |
|            | 5 4 18             | 15 35 $\frac{1}{3}$ | 20 26 U.               | 67 24 50                  | 50 33 $\frac{1}{2}$ |                        |                  | C.      | ☉ & ☉.                 |
| ☉ — 12.    | Noon.              | 53 32 $\frac{1}{2}$ |                        |                           | 49 40 $\frac{1}{2}$ |                        | 59               |         | ☉'s Merid. Altitude.   |
|            | 4 14 8             | 26 12 $\frac{1}{3}$ | 19 36 $\frac{1}{3}$ U. | 80 12 50                  |                     | 89 58                  |                  | G.      | ☉ & ☉.                 |
|            | 4 14 8             | 26 12 $\frac{1}{3}$ | 19 36 $\frac{1}{3}$ U. | 80 13 5                   |                     | 90 13                  |                  | C.      | ☉ & ☉.                 |
|            | 4 24 15            | 24 41 $\frac{1}{3}$ | 19 48 $\frac{1}{3}$ U. | 80 16 20                  | 49 43               | 89 40                  |                  | G.      | ☉ & ☉.                 |
|            | 4 24 15            | 24 41 $\frac{1}{3}$ | 19 48 $\frac{1}{3}$ U. | 80 17 10                  | 49 43               | 90 13                  |                  | C.      | ☉ & ☉.                 |
|            | 4 32 2             | 23 19 $\frac{2}{3}$ | 19 56 $\frac{1}{3}$ U. | 80 20 00                  | 49 23               | 89 29 $\frac{1}{4}$    |                  | G.      | ☉ & ☉.                 |
|            | 4 32 2             | 23 19 $\frac{2}{3}$ | 19 56 $\frac{1}{3}$ U. | 80 20 20                  | 49 23               | 90 13                  |                  | C.      | Ditto.                 |
| ☉ — 13.    | Noon.              | 53 21               |                        |                           | 49 31 $\frac{1}{2}$ |                        | 56               |         | ☉'s Merid. Altitude.   |
| ☉ — 14.    | Noon.              | 53 25               |                        |                           | 49 7                |                        | 60               |         | Ditto.                 |
|            | 5 9 38             | 17 12               | 12 59 $\frac{1}{3}$ U. | 106 49 30                 |                     | 90 52 $\frac{1}{2}$ *  |                  | G.      | ☉ & ☉.                 |
|            | 5 18 5             | 15 49 $\frac{1}{3}$ | 13 28 $\frac{2}{3}$ U. | 106 53 32                 |                     | 91 9 *                 |                  | G.      | ☉ & ☉.                 |
|            | 5 25 57            | 14 31               | 13 55 $\frac{2}{3}$ U. | 106 57 0                  | 49 1                | 91 19 *                |                  | G.      | ☉ & ☉.                 |
|            | 5 34 47            | 13 3                | 14 25 $\frac{2}{3}$ U. | 107 00 30                 |                     | 90 49 *                |                  | G.      | ☉ & ☉.                 |
|            | 9 32 55            | 20 19               | 8 34 L.                | 70 54 00                  | 48 55               | 91 4 $\frac{1}{2}$ *   |                  | G.      | ☉ & Reg. Obs. on Q. D. |
| ☉ — 15.    | Noon.              | 53 44               |                        |                           | 48 27               |                        | 62               |         | ☉'s Merid. Altitude.   |
| ☉ — 16.    | Noon.              | 53 49               |                        |                           | 48 1                |                        | 59               |         | Ditto.                 |
| ☉ — 17.    | Noon.              |                     |                        |                           | 46 48               |                        | 61               |         | Latitude observed.     |
| ☉ — 18.    | Noon.              |                     |                        |                           | 44 50               |                        | 63               |         | Ditto.                 |
| ☉ — 19.    | Noon.              |                     |                        |                           | 43 21               |                        | 61 $\frac{1}{2}$ |         | Ditto.                 |
| ☉ — 20.    | Noon.              |                     |                        |                           | 43 46               |                        | 66               |         | Ditto.                 |
| ☉ — 21.    | Noon.              |                     |                        |                           | 44 39               |                        | 66               |         | Ditto.                 |
| ☉ — 22.    | Noon.              |                     |                        |                           | 44 46               |                        | 66               |         | Latitude by account.   |
| ☉ — 23.    | Noon.              |                     |                        |                           | 44 35               |                        | 66               |         | Latitude observed.     |
| ☉ — 24.    | Noon.              |                     |                        |                           | 43 37               |                        | 64               |         | Ditto.                 |
| ☉ — 25.    | Noon.              |                     |                        |                           | 42 23               |                        | 67               |         | Ditto.                 |
| ☉ — 26.    | Noon.              |                     |                        |                           | 41 4                |                        | 67               |         | Ditto.                 |
|            | 21 15 55           | 19 29 $\frac{1}{3}$ | 55 15 $\frac{2}{3}$ U. | 102 3 50                  |                     | 108 56                 |                  | G.      | ☉ & ☉.                 |
|            | 21 20 32           | 20 21               | 54 29 U.               | 102 2 0                   |                     | 109 10                 |                  | G.      | ☉ & ☉.                 |
| ☉ — 27.    | Noon.              |                     |                        |                           | 39 43               |                        | 67               |         | Observed on the Poop.  |
|            | 20 44 33           | 36 27 $\frac{2}{3}$ | 47 49 $\frac{2}{3}$ U. | 90 39 20                  |                     | 109 52 $\frac{1}{4}$ * |                  | G.      | ☉ & ☉.                 |
|            | 20 44 33           | 36 27 $\frac{2}{3}$ | 47 49 $\frac{2}{3}$ U. | 90 38 55                  | 39 52               |                        |                  | C.      | ☉ & ☉.                 |
|            | 20 52 25           | 37 51               | 46 21 U.               | 90 37 0                   |                     | 109 57 $\frac{3}{4}$ * |                  | C.      | ☉ & ☉.                 |
|            | 20 52 25           | 37 51               | 46 21 U.               | 90 38 50                  |                     |                        |                  | G.      | ☉ & ☉.                 |
|            | 20 59 4            | 39 1 $\frac{2}{3}$  | 45 9 U.                | 90 33 50                  | 39 52               | 109 56 *               |                  | C.      | ☉ & ☉.                 |
|            | 20 59 4            | 39 1 $\frac{2}{3}$  | 45 9 U.                | 90 36 20                  |                     |                        |                  | C.      | ☉ & ☉.                 |
| ☉ — 28.    | Noon.              | 57 53               |                        |                           | 39 32 $\frac{2}{3}$ |                        | 68               |         | ☉'s Merid. Altitude.   |
| ☉ March 1. | Noon.              |                     |                        |                           | 38 44               |                        | 69               |         | Latitude observed.     |
| ☉ — 2.     | Noon.              | 59 22               |                        |                           | 37 18               |                        | 70               |         | ☉'s Merid. Altitude.   |
| ☉ — 3.     | Noon.              | 59 27               |                        |                           | 36 49 $\frac{3}{4}$ |                        | 70               |         | Ditto.                 |

# ASTRONOMICAL OBSERVATIONS.

25

| 1769.  | Time by the Watch. | Alt. $\odot$ 's   | Moon's           | Dist. $\odot$ 's L.    | Ship's    | Long. W. of         | Thermo.                | Observ. | PHENOMENA<br>AND<br>REMARKS.          |
|--|--------------------|---|------------------|------------------------|-----------|---------------------|------------------------|---------|---------------------------------------|
|  |                    | L.L. or *   |                  |                        |           |                     |                        |         |                                       |
| H  | "                  | o   | '                | o                      | '         | o                   | '                      |         |                                       |
| $\frac{1}{2}$ March 4.   | Noon.              | 59  | 41               |                        |           | 36 12 $\frac{3}{4}$ |                        | 74      | $\odot$ 's Merid. Altitude.           |
| $\odot$ — 5.   | Noon.              | 59  | 10               |                        |           | 36 20 $\frac{1}{3}$ |                        | 73      | Ditto.                                |
| $\frac{1}{2}$ — 6.   | Noon.              | 58  | 35               |                        |           | 36 32               |                        | 75      | Ditto.                                |
| $\delta$ — 7.  | Noon.              | 57  | 37               |                        |           | 37 6 $\frac{3}{4}$  |                        | 73      | Ditto.                                |
| $\delta$ — 8.  | Noon.              |   |                  |                        |           | 37 24               |                        |         | Latitude by account.                  |
| $\frac{1}{2}$ — 9.   | Noon.              | 58  | 9                |                        |           | 35 47 $\frac{1}{2}$ |                        | 65      | $\odot$ 's Merid. Altitude.           |
| $\frac{1}{2}$ — 10.  | Noon.              |   |                  |                        |           | 34 14               |                        |         | Latitude by account.                  |
| $\frac{1}{2}$ — 11.  | Noon.              | 60  | 15               |                        |           | 32 54               |                        | 72      | $\odot$ 's Merid. Altitude.           |
| $\odot$ — 12.  | Noon.              | 61  | 12               |                        |           | 31 33 $\frac{1}{3}$ |                        | 73      | Ditto.                                |
|  | 3 40 13            | 30  | 34               | 35 47 U.               | 63 39 40  | 31 20               | 125 6 $\frac{1}{2}$    |         | G. $\odot$ & $\odot$ . On Forecastle. |
|  | 3 40 13            | 30  | 34               | 35 47 U.               | 63 40 20  | 31 20               |                        |         | C. Ditto.                             |
| $\frac{1}{2}$ — 13.  | Noon.              | 61  | 35               |                        |           | 30 46 $\frac{3}{4}$ |                        | 76      | $\odot$ 's Merid. Altitude.           |
|  | 3 2 34             | 37  | 20 $\frac{1}{3}$ | 28 59 $\frac{1}{3}$ U. | 76 51 30  |                     | 126 23 $\frac{3}{4}$ * |         | G. $\odot$ & $\odot$ .                |
|  | 3 2 34             | 37  | 20 $\frac{1}{3}$ | 28 59 $\frac{1}{3}$ U. | 76 52 0   |                     |                        |         | C. $\odot$ & $\odot$ .                |
|  | 3 8 58             | 36  | 0 $\frac{1}{3}$  | 29 35 U.               | 76 54 30  | 30 45               | 126 3 $\frac{1}{2}$ *  |         | G. $\odot$ & $\odot$ .                |
|  | 3 8 58             | 36  | 0 $\frac{1}{3}$  | 29 35 U.               | 76 54 30  |                     |                        |         | C. $\odot$ & $\odot$ .                |
|  | 3 17 5             | 34  | 22 $\frac{2}{3}$ | 30 21 $\frac{2}{3}$ U. | 76 56 40  |                     | 125 45 *               |         | G. $\odot$ & $\odot$ .                |
|  | 3 17 5             | 34  | 22 $\frac{2}{3}$ | 30 21 $\frac{2}{3}$ U. | 76 56 30  |                     |                        |         | C. $\odot$ & $\odot$ .                |
| $\delta$ — 14.   | Noon.              | 61  | 41               |                        |           | 30 17               |                        | 75      | $\odot$ 's Merid. Altitude.           |
| $\delta$ — 15.   | Noon.              | 61  | 50               |                        |           | 29 44 $\frac{1}{3}$ |                        | 79      | Ditto.                                |
|  | 5 13 43            | 9   | 19 $\frac{1}{3}$ | 32 38 U.               | 103 40 00 | 29 40 $\frac{1}{3}$ | 126 40 *               |         | G. $\odot$ & $\odot$ . } Observed on  |
|  | 5 22 53            | 7   | 23               | 33 27 $\frac{2}{3}$ U. | 103 43 10 |                     | 126 27 *               |         | G. $\odot$ & $\odot$ . } the Q. D.    |
|  | 8 1 7              | $\frac{1}{2}$ immersed totally behind the $\odot$ 's dark limb. Appa. Time 8 <sup>h</sup> 7' 41".     |                  |                        |           |                     |                        |         |                                       |
|  | 8 55 50            | $\frac{1}{2}$ emerged totally from the $\odot$ 's enlightened limb. Appa. Time 9 <sup>h</sup> 2' 24". |                  |                        |           |                     |                        |         |                                       |
| This occultation of $\frac{1}{2}$ by the Moon was observed with a four feet Refractor, made by Mr. Dollond, with which the Satellites of Jupiter could be seen in a clear night. |                    |   |                  |                        |           |                     |                        |         |                                       |
| $\frac{1}{2}$ — 16.  | Noon.              | 61  | 59               |                        |           | 29 11 $\frac{2}{3}$ |                        | 80      | $\odot$ 's Meridian Altitude.         |
|  | 5 24 28            | 7   | 52 $\frac{2}{3}$ | 29 46 $\frac{1}{3}$ U. | 116 22 50 | 29 01               | 126 46 $\frac{1}{4}$ * |         | G. $\odot$ & $\odot$ . } Observed on  |
|  | 5 32 11            | 6   | 14               | 30 49 $\frac{2}{3}$ U. | 116 25 00 | 29 01               | 127 0 $\frac{1}{2}$ *  |         | G. $\odot$ & $\odot$ . } the Quarter  |
|  | 5 39 12            | 4   | 43 $\frac{1}{3}$ | 31 45 U.               | 116 26 30 |                     | 127 19 $\frac{1}{2}$ * |         | G. $\odot$ & $\odot$ . } Deck.        |
|  | 8 15 33            | 19  | 49               | 41 24 $\frac{1}{3}$ U. | 48 1 30   | 28 56 $\frac{3}{4}$ | 126 35 $\frac{1}{4}$   |         | G. $\odot$ & Ald. } Observ. on        |
|  | 8 28 43            | 17  | 22               | 40 17 $\frac{1}{3}$ L. | 48 3 20   | 28 56 $\frac{1}{2}$ | 126 57                 |         | G. $\odot$ & Ald. } the Quar-         |
|  | 8 44 10            | 14  | 25               | 39 22 $\frac{1}{3}$ L. | 48 7 37   | 28 56               | 127 9                  |         | G. $\odot$ & Ald. } ter Deck.         |
|  | 9 2 18             | 45  | 29               | 38 12 $\frac{1}{3}$ L. | 31 57 0   | 28 55 $\frac{2}{3}$ | 127 19                 |         | G. $\odot$ & Regulus. Q. Deck.        |
| $\frac{1}{2}$ — 17.  | Noon.              | 62  | 16               |                        |           | 28 31               |                        | 78      | $\odot$ 's Meridian Altitude.         |
| $\frac{1}{2}$ — 18.  | Noon.              | Cloudy  |                  |                        |           | 27 52               |                        | 79      | Latitude by account.                  |
|  | 8 3 23             | 32  | 14 $\frac{2}{3}$ | 47 14 $\frac{1}{3}$ U. | 32 48 20  |                     | 126 37                 |         | G. $\odot$ & Pollux. } Observ.        |
|  | 8 13 39            | 31  | 35               | 48 47 $\frac{1}{3}$ U. | 32 54 00  | 28 6                | 126 55 $\frac{1}{2}$   |         | G. $\odot$ & Pollux. } on the         |
|  | 8 25 10            | 30  | 29 $\frac{2}{3}$ | 49 41 $\frac{1}{3}$ U. | 32 57 30  |                     | 127 31 $\frac{1}{2}$   |         | G. $\odot$ & Pollux. } Q. D.          |
|  | 8 39 32            | 27  | 21 $\frac{2}{3}$ | 50 9 U.                | 60 56 40  | 28 6                | 127 35 $\frac{3}{4}$   |         | G. $\odot$ & Spi. m. Obs. on P.       |
| $\odot$ — 19.  | Noon.              | 62  | 20               |                        |           | 27 39 $\frac{1}{4}$ |                        | 78      | $\odot$ 's Meridian Altitude.         |
| $\frac{1}{2}$ — 20.  | Noon.              | 63  | 52               |                        |           | 25 43 $\frac{3}{4}$ |                        | 79      | Ditto.                                |
| $\delta$ — 21.   | Noon.              | 63  | 50               |                        |           | 25 22               |                        | 81      | Ditto.                                |
| $\delta$ — 22.   | Noon.              | 63  | 26               |                        |           | 25 22 $\frac{1}{3}$ |                        | 81      | Ditto.                                |
| $\frac{1}{2}$ — 23.  | Noon.              | 63  | 40               |                        |           | 24 44 $\frac{2}{3}$ |                        | 80      | Ditto.                                |

## ASTRONOMICAL OBSERVATIONS.

| 1769.       | Time by the Watch.     | Alt. $\odot$ 's L.L. or * | Moon's Altitude.       | Dist. $\odot$ 's L. from $\odot$ or * | Ship's Latit. S.    | Long. W. of Greenwich. | Thermo. | Observ. | PHENOMENA AND REMARKS.                     |
|-------------|------------------------|---------------------------|------------------------|---------------------------------------|---------------------|------------------------|---------|---------|--|
|             | H "                    | ° '                       | ° '                    | ° ' "                                 | ° '                 | ° '                    |         |         |  |
| ♀ March 24. | Noon.                  | 64 33                     |                        |                                       | 23 28               |                        | 78      |         | $\odot$ 's Merid. Altitude.                |
| ♂ — 25.     | Noon.                  | Cloudy                    |                        |                                       | 22 11               |                        | 79      |         | Latitude by account.                       |
| ☉ — 26.     | Noon.                  | 65 44                     |                        |                                       | 21 30 $\frac{1}{2}$ |                        | 79      |         | $\odot$ 's Meridian Altitude.              |
| ☾ — 27.     | Noon.                  | 65 48                     |                        |                                       | 21 2 $\frac{3}{4}$  |                        | 80      |         | Ditto.                                     |
| ♂ — 28.     | Noon.                  | 65 58                     |                        |                                       | 20 29 $\frac{1}{2}$ |                        | 81      |         | Ditto.                                     |
| ♀ — 29.     | Noon.                  | 65 50                     |                        |                                       | 20 14               |                        | 82      |         | Ditto.                                     |
|             | 22 25 17               | 56 22 $\frac{1}{2}$       | 32 18 $\frac{2}{3}$ U. | 87 26 50                              | 19 38 $\frac{1}{2}$ | 126 48 $\frac{3}{4}$   | *       | G.      | $\odot$ & $\odot$ .                        |
|             | 22 25 17               | 56 22 $\frac{1}{2}$       | 32 18 $\frac{2}{3}$ U. | 87 27 40                              |                     | 126 22                 | *       | C.      | $\odot$ & $\odot$ .                        |
|             | 22 32 14               | 57 35 $\frac{1}{2}$       | 30 45 $\frac{2}{3}$ U. | 87 24 0                               |                     | 126 51 $\frac{1}{2}$   | *       | G.      | $\odot$ & $\odot$ .                        |
|             | 22 32 14               | 57 35 $\frac{1}{2}$       | 30 45 $\frac{2}{3}$ U. | 87 24 10                              |                     | 126 46 $\frac{1}{4}$   | *       | C.      | $\odot$ & $\odot$ .                        |
|             | 22 39 30               | 58 47                     | 29 9 U.                | 87 20 0                               |                     | 127 27 $\frac{3}{4}$   | *       | G.      | $\odot$ & $\odot$ .                        |
|             | 22 39 30               | 58 47                     | 29 9 U.                | 87 21 0                               |                     | 126 51                 | *       | C.      | $\odot$ & $\odot$ .                        |
|             | 22 46 55               | 59 54 $\frac{2}{3}$       | 27 23 $\frac{1}{2}$ U. | 87 16 40                              | 19 37 $\frac{3}{4}$ | 127 41 $\frac{1}{2}$   | *       | G.      | $\odot$ & $\odot$ .                        |
|             | 22 46 55               | 59 54 $\frac{2}{3}$       | 27 23 $\frac{1}{2}$ U. | 87 16 50                              |                     | 127 36 $\frac{1}{4}$   | *       | C.      | $\odot$ & $\odot$ .                        |
| ♂ — 30.     | Noon.                  | 66 6                      |                        |                                       | 19 34 $\frac{3}{4}$ |                        | 81      |         | $\odot$ 's Meridian Altitude.              |
|             | 21 25 22               | 44 25 $\frac{2}{3}$       | 57 13 U.               | 76 13 33                              | 19 8                | 129 17                 | *       | G.      | $\odot$ & $\odot$ .                        |
|             | 21 25 22               | 44 25 $\frac{2}{3}$       | 57 13 U.               | 76 13 30                              |                     | 129 18 $\frac{1}{2}$   | *       | C.      | $\odot$ & $\odot$ .                        |
|             | 21 35 16               | 46 28 $\frac{2}{3}$       | 55 1 $\frac{1}{2}$ U.  | 76 9 40                               |                     | 129 42 $\frac{1}{4}$   | *       | G.      | $\odot$ & $\odot$ .                        |
|             | 21 35 16               | 46 28 $\frac{2}{3}$       | 55 1 $\frac{1}{2}$ U.  | 76 9 50                               |                     | 129 37                 | *       | C.      | $\odot$ & $\odot$ .                        |
|             | 21 45 35               | 48 36                     | 52 38 $\frac{1}{2}$ U. | 76 6 50                               |                     | 129 32                 | *       | G.      | $\odot$ & $\odot$ .                        |
|             | 21 45 35               | 48 36                     | 52 38 $\frac{1}{2}$ U. | 76 7 20                               |                     | 129 16                 | *       | C.      | $\odot$ & $\odot$ .                        |
|             | 22 17 6                | 54 45                     | 45 23 $\frac{2}{3}$ U. | 75 58 0                               |                     | 128 37 $\frac{1}{2}$   | *       | C.      | $\odot$ & $\odot$ .                        |
|             | 22 27 35               | 56 30                     | 43 1 $\frac{1}{2}$ U.  | 75 53 40                              |                     | 129 10                 | *       | G.      | $\odot$ & $\odot$ .                        |
|             | 22 35 2                | 57 43 $\frac{1}{2}$       | 41 19 $\frac{1}{4}$ U. | 75 49 50                              | 19 8 $\frac{1}{4}$  | 129 50 $\frac{1}{2}$   | *       | G.      | $\odot$ & $\odot$ .                        |
| ♀ — 31.     | Noon.                  | 66 9                      |                        |                                       | 19 8 $\frac{1}{2}$  |                        | 79      |         | $\odot$ 's Meridian Altitude.              |
| ♂ April 1.  | Noon.                  | 65 50                     |                        |                                       | 19 4 $\frac{1}{4}$  |                        | 80      |         | Ditto.                                     |
|             | 19 20 30               | 15 0                      | 67 47 $\frac{2}{3}$ L. | 52 31 10                              | 19 2 $\frac{1}{2}$  | 133 26 $\frac{1}{2}$   | *       | G.      | $\odot$ & $\odot$ .                        |
|             | 19 31 13               | 17 24 $\frac{1}{2}$       | 69 58 $\frac{2}{3}$ L. | 52 27 57                              | 19 2 $\frac{1}{2}$  | 133 37 $\frac{1}{2}$   | *       | G.      | $\odot$ & $\odot$ .                        |
|             | 19 40 32 $\frac{1}{2}$ | 19 32 $\frac{1}{2}$       | 71 56 $\frac{1}{2}$ L. | 52 25 15                              | 19 2                | 133 44 $\frac{3}{4}$   | *(2)    | G.      | $\odot$ & $\odot$ .                        |
|             | 21 20 43               | 41 47                     | 78 45 $\frac{2}{3}$ U. | 51 57 20                              | 19 1 $\frac{1}{4}$  | 133 52 $\frac{1}{2}$   | *       | G.      | $\odot$ & $\odot$ .                        |
|             | 21 28 28               | 43 24 $\frac{2}{3}$       | 77 41 $\frac{1}{2}$ U. | 51 55 00                              | 19 1 $\frac{1}{4}$  | 133 54 $\frac{3}{4}$   | *       | G.      | $\odot$ & $\odot$ .                        |
| ☉ — 2.      | Noon.                  | 65 30                     |                        |                                       | 19 1 $\frac{1}{4}$  |                        | 83      |         | $\odot$ 's Meridian Altitude.              |
| ☾ — 3.      | Noon.                  | 65 22                     |                        |                                       | 18 46               |                        | 82      |         | Ditto.                                     |
| ♂ — 4.      | Noon.                  | 65 3 $\frac{1}{2}$        |                        |                                       | 18 41 $\frac{2}{3}$ |                        |         |         | Ditto.                                     |
| ♀ — 5.      | Noon.                  | 64 59                     |                        |                                       | 18 23 $\frac{1}{2}$ |                        | 83      |         | Ditto.                                     |
| ♂ — 6.      | Noon.                  | 64 40                     |                        |                                       | 18 19 $\frac{2}{3}$ |                        | 84      |         | Ditto.                                     |
| ♀ — 7.      | Noon.                  | 64 48                     |                        |                                       | 17 49               |                        | 82      |         | Ditto.                                     |
| ♂ — 8.      | Noon.                  | 64 30 $\frac{1}{2}$       |                        |                                       | 17 44               |                        | 83      |         | Ditto.                                     |
| ☉ — 9.      | Noon.                  | 64 10                     |                        |                                       | 17 42 $\frac{1}{4}$ |                        | 83      |         | Ditto.                                     |
| ☾ — 10.     | Noon.                  | 63 29                     |                        |                                       | 18 1                |                        | 79      |         | Ditto.                                     |
|             | 5 6 3                  | 8 34 $\frac{5}{6}$        | 45 10 $\frac{2}{3}$ U. | 60 32 20                              | 17 59               | 148 6 $\frac{3}{4}$    | *       | G.      | $\odot$ & $\odot$ .                        |
|             | 5 6 3                  | 8 34 $\frac{5}{6}$        | 45 10 $\frac{2}{3}$ U. | 60 33 15                              | 17 59               | 148 31 $\frac{1}{2}$   | *       | C.      | $\odot$ & $\odot$ .                        |
|             | 5 11 46                | 7 12 $\frac{1}{6}$        | 44 54 U.               | 60 34 13                              | 17 59               | 148 28 $\frac{3}{4}$   | *       | G.      | $\odot$ & $\odot$ .                        |
|             | 5 11 46                | 7 12 $\frac{1}{6}$        | 44 54 U.               | 60 34 58                              | 17 59               | 148 49                 | *       | C.      | $\odot$ & $\odot$ .                        |
| ♂ — 11.     | Noon.                  | 63 29 $\frac{1}{2}$       |                        |                                       |                     |                        | 83      |         | Otaheite S. to W. by N. distant 5 leagues. |

Observed on  
the Main  
Deck.Observed on  
the Poop.Observed on  
the Poop.M. D. Ofna-  
burgh Island,  
or Miatea N.  
by E. dist. 8  
or 9 miles.



# ASTRONOMICAL OBSERVATIONS.

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| 1769.     | Time by the Watch. |    | Altitude ☉'s L. L. or *. |    | Moon's Altitude. |                  | Dist. ☉'s L. from ☉ or *. |    | Ship's Latit. S. |    | Long. W. of Greenwich. |     | Thermo.          | Obsev.           | PHENOMENA AND REMARKS.                  |   |   |
|-----------|--------------------|----|--------------------------|----|------------------|------------------|---------------------------|----|------------------|----|------------------------|-----|------------------|------------------|---|---|---|
|           | H                  | M  | °                        | '  | °                | '                | °                         | '  | °                | '  | °                      | '   |                  |                  |   |   |   |
| April 26. | 22                 | 1  | 10                       | 47 | 51               | 20               | 9 $\frac{1}{2}$           | U. | 105              | 50 | 40                     | 148 | 34 $\frac{1}{4}$ | *                | G.                                      | D & ☉. }<br>Observed on Point Venus, in Otaheite. |   |
|           | 22                 | 1  | 10                       | 47 | 51               | 20               | 9 $\frac{1}{2}$           | U. | 105              | 49 | 50                     | 149 | 1                | *                | C.                                      |   |   |
|           | 22                 | 14 | 18                       | 49 | 57               | 17               | 11 $\frac{1}{2}$          | U. | 105              | 44 | 40                     | 148 | 30 $\frac{3}{4}$ | *                | G.                                      |   |   |
|           | 22                 | 14 | 18                       | 49 | 57               | 17               | 11 $\frac{1}{2}$          | U. | 105              | 43 | 45                     | 148 | 59 $\frac{3}{4}$ | *                | C.                                      |   |   |
|           | 22                 | 25 | 15                       | 51 | 32 $\frac{2}{3}$ | 14               | 44 $\frac{2}{3}$          | U. | 105              | 39 | 0                      | 148 | 42 $\frac{1}{4}$ | *                | G.                                      |   |   |
|           | 22                 | 25 | 15                       | 51 | 32 $\frac{2}{3}$ | 14               | 44 $\frac{2}{3}$          | U. | 105              | 39 | 5                      | 148 | 39 $\frac{1}{2}$ | *                | C.                                      |   |   |
|           | ☉ — 30.            | 22 | 7                        | 14 | 49               | 34               | 54                        | 28 | U.               | 57 | 31                     | 30  | 148              | 57 $\frac{1}{2}$ | *                                       | G.  | D & ☉. }<br>Observed on Point Venus, in Otaheite. |
|           |                    | 22 | 7                        | 14 | 49               | 34               | 54                        | 28 | U.               | 57 | 32                     | 5   | 148              | 41               | *                                       | C.  |   |
|           |                    | 22 | 18                       | 46 | 51               | 10               | 51                        | 52 | U.               | 57 | 26                     | 40  | 149              | 18               | *                                       | G.  |   |
|           |                    | 22 | 18                       | 46 | 51               | 10               | 51                        | 52 | U.               | 57 | 27                     | 25  | 148              | 57               | *                                       | C.  |   |
|           |                    | 22 | 27                       | 54 | 52               | 16 $\frac{2}{3}$ | 49                        | 53 | U.               | 57 | 23                     | 55  | 149              | 6 $\frac{1}{4}$  | *                                       | G.  |   |
|           |                    | 22 | 27                       | 54 | 52               | 16 $\frac{2}{3}$ | 49                        | 53 | U.               | 57 | 24                     | 30  | 148              | 49 $\frac{1}{4}$ | *                                       | C.  |   |
| May 6.    | Noon.              |    | 34                       | 33 | 7                |                  |                           |    | 17 29 28         |    |                        |     |                  |                  | Z. D. ☉'s L. L. Astron. Quad. C. G.     |   |   |
|           | Noon.              |    | 55                       | 30 | 30               |                  |                           |    | 17 29 21         |    |                        |     |                  |                  | Altitude ☉'s L. L. Hadley's Quad. C. G. |   |   |

OBSERVATIONS

## OBSERVATIONS of equal ALTITUDES of the SUN,

Made on Point Venus, in Otaheite, with an Astronomical Quadrant, of one Foot Radius, for finding the apparent Time, and Rate of Going of a Clock.

| 1769.    | Times by the Clock. |                           |                    | Time of Apparent Noon by the Clock. | Phenomena and Observer.              | REMARKS.   |
|----------|---------------------|---------------------------|--------------------|-------------------------------------|--------------------------------------|--|
|          | Lower Wire.         | Middle Wire.              | Upper Wire.        |                                     |                                      |  |
|          | " "                 | H " "                     | " "                |                                     |                                      |  |
| ♂ May 9. | 39 5½<br>42 20      | 21 41 43<br>45 00         | 44 25<br>47 42½    | 23 51 44, 8                         | ☉'s U. L.<br>☉'s L. L.<br>Mr. Green. | None of these observations good; the sun being in a confused haze. |
| ♀ — 10.  | 00 57<br>4 11½      | 1 58 18<br>2 1 35         | 55 34½<br>58 53    |                                     | ☉'s L. L.<br>☉'s U. L.<br>☉'s U. L.  |  |
| ♂ — 11.  | 9 8<br>12 9         | 21 11 36<br>14 35         | 14 00<br>17 1      |                                     | ☉'s U. L.<br>☉'s L. L.<br>Mr. Green. |  |
| ♀ — 12.  | 29 36<br>Cloudy.    | 2 27 10<br>2 30 8         | 24 45<br>Cloudy.   | 23 50 58, 3                         | ☉'s L. L.<br>☉'s U. L.<br>☉'s U. L.  |  |
| "        | 11 38<br>14 40      | 21 14 4<br>17 4½          | 16 31<br>19 33     | ☉'s U. L.<br>☉'s L. L.              |                                      |  |
| ♂ — 13.  | 26 24<br>29 22      | Too late for these wires. |                    | 23 50 36, 7                         | Mr. Green.<br>☉'s L. L.<br>☉'s U. L. |  |
| ♀ — 14.  | 39 23<br>42 47      | 21 42 8<br>45 30          | 44 52<br>48 16     | ☉'s U. L.<br>☉'s L. L.              |                                      |  |
| ☉ — 14.  | Cloudy.<br>Cloudy.  | 1 54 46::<br>Cloudy.      | 52 00:<br>55 24    | 23 50 13, 7                         | Mr. Green.<br>☉'s L. L.<br>☉'s U. L. |  |
| ♂ — 16.  | 27 52<br>31 5       | 21 30 30<br>33 45½        | 33 9<br>36 25      | ☉'s U. L.<br>☉'s L. L.              |                                      |  |
| ♀ — 17.  | 7 14<br>10 27       | 2 4 33½<br>2 7 50         | 5 09½              | 23 49 15, 0                         | Mr. Green.<br>☉'s L. L.<br>☉'s U. L. |  |
| "        | 21 2<br>23 45       | 20 23 15<br>25 56         | 25 27<br>28 11     | ☉'s U. L.<br>☉'s L. L.              |                                      |  |
| ♂ — 18.  | 36 31½<br>39 19     | 20 38 47<br>41 36         | 41 5<br>43 53      | ☉'s U. L.<br>☉'s L. L.              |                                      |  |
| ♀ — 20.  | 58 26::<br>1 11     | 2 56 6½<br>2 59 00:       | 53 52::<br>Cloudy. | 23 48 56, 8                         | Mr. Green.<br>☉'s L. L.<br>☉'s U. L. |  |
| "        | 14 00:<br>16 41:    | 3 11 45<br>Cloudy.        | Cloudy.<br>12 15:  | ☉'s L. L.<br>☉'s U. L.              |                                      |  |
| ♂ — 20.  | 44 51<br>48 23      | 21 47 44<br>21 51 19      | 50 39<br>54 17     | ☉'s U. L.<br>☉'s L. L.              |                                      |  |

# ASTRONOMICAL OBSERVATIONS.

29

| 1769.  | Times by the Clock. |              |             | Time of Apparent Noon by the Clock. | Phenomenon and Observer. | REMARKS.              |
|--|---------------------|--------------|-------------|-------------------------------------|--------------------------|-----------------------|
|  | Lower Wire.         | Middle Wire. | Upper Wire. |                                     |                          |                       |
|  | " "                 | H " "        | " "         |                                     |                          |                       |
| ☉ May 21.  | 47 27               | 1 44 36      | 41 37       | 23 48 2,6                           | Mr. Green.               |                       |
|  | 51 7                | 1 48 12      | 45 19       |                                     | ☉'s L. L.                |                       |
| ☽ — 22.  | 12 24               | 21 14 59½    | 17 33       |                                     | ☉'s U. L.                |                       |
|  | 15 34               | 21 18 8½     | 20 43       |                                     | ☉'s U. L.                |                       |
|  | 30 46½              | 21 33 31     | 36 16       |                                     | ☉'s L. L.                |                       |
|  | 34 7                | 21 36 55     | 39 42½      |                                     | ☉'s U. L.                |                       |
| ♂ — 23.  | 0 39                | 1 57 52      | 55 5        | 23 47 29,4                          | Mr. Green.               |                       |
|  | 3 57                | 2 1 15       | 58 28       |                                     | ☉'s L. L.                |                       |
|  | 19 20               | 2            | 14 11       |                                     | ☉'s U. L.                |                       |
|  | 22 27               | 2 19 54      | 17 20       |                                     | ☉'s L. L.                |                       |
|  | 43 17               | 19 45 26     | 47 33       |                                     | ☉'s U. L.                |                       |
|  | 45 55               | 19 48 2      | 50 10       |                                     | ☉'s L. L.                |                       |
|  | 5 29                | 20 7 39      | 9 52        |                                     | ☉'s U. L.                |                       |
|  | 8 10                | 20 10 21     | 12 33       |                                     | ☉'s L. L.                |                       |
| ♀ — 24.  | 26 11               | 3 23 59      | 21 49       | 23 47 14,1                          | Capt. Cook.              | Observed with a stop. |
|  | 28 52               | 3 26 41      | 24 29       |                                     | ☉'s L. L.                |                       |
|  | 48 26               | 3 46 16      | 44 9        |                                     | ☉'s U. L.                |                       |
|  | 51 1                | 3 48 52      | 46 45       |                                     | ☉'s L. L.                |                       |
|  | 4 21½               | 22 7 41½     | 11 2½       |                                     | ☉'s U. L.                |                       |
|  | 8 26½               | 22 11 50½    | 15 16       |                                     | ☉'s L. L.                |                       |
| ☿ — 25.  | 25 27               | 1 22 3       | Cloudy.     | 23 47 1,1                           | Capt. Cook.              |                       |
|  | 29 32               | 1 26 12      | 22 49       |                                     | ☉'s L. L.                |                       |
| ♀ — 26.  | 15 59               | 20 18 20     | 20 35½      |                                     | ☉'s U. L.                |                       |
|  | 18 42               | 20 21 11     | 23 20       |                                     | ☉'s L. L.                |                       |
| ♂ — 27.  | 14 7                | 3 11 46      | 9 35        | 23 46 30,6                          | Mr. Green.               |                       |
|  | 16 51               | 3 14 33      | 12 21       |                                     | ☉'s L. L.                |                       |
|  | 41 17               | 20 43 45     | 46 00       |                                     | ☉'s U. L.                |                       |
|  | 44 9                | 20 46 38     | 48 57       |                                     | ☉'s L. L.                |                       |
| ☉ — 28.  | 48 25               | 2 45 54      | 43 37       | 23 46 20,5                          | Mr. Green.               |                       |
|  | 51 17               | 48 49        | 46 31       |                                     | ☉'s L. L.                |                       |
|  | 5 39                | 21 8 18      | 10 48½      |                                     | ☉'s U. L.                |                       |
|  | 8 44½               | 21 11 28     | 13 56½      |                                     | ☉'s L. L.                |                       |
| ☽ — 29.  | 23 20               | 2 20 39      | 18 10       | 23 46 6,5                           | Mr. Green.               |                       |
|  | 26 25               | 2 23 46      | 21 17½      |                                     | ☉'s L. L.                |                       |
|  |                     |              |             |                                     | ☉'s U. L.                |                       |
| Immediately after these observations Mr. Green wound up the Clock, and put it forward 10' 57". |                     |              |             |                                     |                          |                       |
|  | 19 13½              | 21 21 55     | 24 23½      |                                     | ☉'s U. L.                |                       |
|  | 22 23               | 21 25 4½     | 27 35       |                                     | ☉'s L. L.                |                       |

## ASTRONOMICAL OBSERVATIONS.

| 1769.      | Times by the Clock.  |  |  | Time of Apparent<br>Noon by the<br>Clock. | Phenomenon<br>and<br>Observer.  | REMARKS.  |
|------------|--|--|--|---|---|---|
|            | Lower Wire.  | Middle Wire.   | Upper Wire.  |   |   |   |
|            | " "  | H " "  | " " "  |   |   |   |
| May 29.    | 36 52<br>40 16½<br>55 57<br>59 40½   | 21 39 48<br>21 43 11<br>21 59 6½<br>22 2 50  | 42 27½<br>45 53<br>2 2½<br>5 50  |   | ☉'s U. L.<br>☉'s L. L.<br>☉'s U. L.<br>☉'s L. L.  |   |
| ♂ — 30.    | Loft.<br>57 38<br>13 19<br>16 38<br>31 18<br>34 28<br>30 09<br>33 7<br>36 8<br>39 29 | 1 50 48<br>1 54 32<br>2 10 24<br>2 13 47<br>2 28 37<br>2 31 48<br>20 32 30<br>20 35 17½<br>21 38 59<br>21 42 21½ | 47 48<br>51 36<br>Loft.<br>11 7<br>26 6½<br>29 16<br>34 42<br>37 31<br>41 39<br>45 6 | 23 56 52, 6                               | Capt. Cook.<br>☉'s L. L.<br>☉'s U. L.<br>☉'s L. L.<br>☉'s U. L.<br>☉'s L. L.<br>☉'s U. L.<br>☉'s U. L.<br>☉'s L. L.<br>☉'s U. L.<br>☉'s L. L. |   |
| ♀ — 31.    | 13 43<br>17 3½<br>20 4<br>23 1<br>24 00<br>26 46                                     | 2 10 51<br>2 14 13<br>3 17 53<br>3 20 40<br>20 26 19<br>20 29 6  | 8 6<br>11 32<br>15 39<br>18 27<br>28 31<br>31 18                                     | 23 56 38, 9                               | Capt. Cook.<br>☉'s L. L.<br>☉'s U. L.<br>☉'s L. L.<br>☉'s U. L.<br>☉'s U. L.<br>☉'s L. L.   |   |
| 24 June 1. | 26 6<br>28 51<br>39 36<br>42 12<br>54 39<br>57 17                                    | 3 23 46<br>3 26 33<br>19 41 48<br>19 44 24<br>19 56 52<br>19 59 32   | 21 34<br>24 21<br>43 52<br>46 29<br>58 59<br>1 38                                    | 23 56 29, 1                               | Capt. Cook.<br>☉'s L. L.<br>☉'s U. L.<br>☉'s U. L.<br>☉'s L. L.<br>☉'s U. L.<br>☉'s L. L.   |   |
| ♀ — 2.     | 55 17<br>57 54½<br>10 18<br>12 53½<br>36 43<br>39 25<br>46 20<br>48 57               | 3 53 2<br>3 55 42<br>4 8 6<br>4 10 43<br>19 39 1<br>19 41 37<br>19 48 32½<br>19 51 10                            | 50 55<br>53 34<br>6 1<br>8 37<br>41 3<br>43 42<br>50 38½<br>53 15                    | 23 56 18, 9                               | Capt. Cook.<br>☉'s L. L.<br>☉'s U. L.<br>☉'s L. L.<br>☉'s U. L.<br>☉'s U. L.<br>☉'s L. L.<br>☉'s U. L.<br>☉'s L. L.                           |   |
| ♂ — 3.     | 3 5<br>5 40<br>12 35<br>15 17<br>11 43<br>14 26<br>29 50                             | 4 0 50<br>4 3 28<br>4 10 26<br>4 13 00<br>20 14 2<br>20 16 45<br>20 32 13  | 58 45<br>1 21<br>8 22<br>10 57<br>16 12<br>18 56<br>34 28                            | 23 56 3, 2                                | Capt. Cook.<br>☉'s L. L.<br>☉'s U. L.<br>☉'s L. L.<br>☉'s U. L.<br>☉'s U. L.<br>☉'s L. L.<br>☉'s U. L.  | The Clock was ex-<br>posed to the Sun from<br>9 or 10 o'clock in the<br>morning till 4 in the<br>afternoon. |

# ASTRONOMICAL OBSERVATIONS.

31

| 1769.   | Times, by the Clock. |              |             | Time of Apparent Noon by the Clock. | Phenomenon and Observer.   | REMARKS.  |
|---------|----------------------|--------------|-------------|-------------------------------------|--|---|
|         | Lower Wire.          | Middle Wire. | Upper Wire. |                                     |  |   |
|         | " "                  | H " "        | " "         |                                     |  |   |
| June 3. | 32 38                | 20 35 2      | 37 16½      |                                     | ☉'s L. L.<br>Capt. Cook.   | The observations of both yesterday and to-day are as good as can be made. The afternoon observations were made with a stop. |
| ☉ — 4.  | 19 4                 | 3 16 39      | Loft.       | 23 55 53, 3                         | ☉'s L. L.<br>☉'s U. L.<br>☉'s L. L.<br>☉'s U. L.<br>☉'s U. L.<br>☉'s L. L. |   |
|         | 21 50                | 3 19 28      | 17 13       |                                     | ☉'s L. L.<br>Mr. Green.  |   |
|         | 37 16                | 3 34 56      | 32 45       |                                     | ☉'s U. L.<br>☉'s U. L.<br>☉'s L. L.  |   |
|         | 39 58                | 3 37 40      | 35 29       |                                     | ☉'s L. L.<br>☉'s L. L.   |   |
|         | 11 42                | 21 14 16     | 16 48½      |                                     | ☉'s U. L.<br>☉'s L. L.   |   |
|         | 14 47                | 21 17 17     | 19 48       |                                     | ☉'s L. L.<br>Mr. Green.  |   |
| D — 5.  | 36 29½               | 2 33 59      | 31 28       | 23 55 40, 8                         | ☉'s L. L.<br>☉'s U. L.<br>☉'s U. L.  |   |
|         | 39 35                | 2 37 00      | 34 27       |                                     | ☉'s L. L.<br>Mr. Green.  |   |
|         | 13 19                | 20 Cloudy.   | 17 48       |                                     | ☉'s U. L.<br>☉'s L. L.   |   |
|         | 16 1                 | 20 18 22*    | 20 34       |                                     | ☉'s L. L.<br>Mr. Green.  | Observed with a stop.   |
| ♂ — 6.  | 34 57                | 3 32 37      | 30 26       | 23 55 31, 4                         | ☉'s L. L.<br>☉'s U. L.<br>☉'s U. L.  |   |
|         | 37 36                | Cloudy.      | 33 10       |                                     | ☉'s L. L.<br>Mr. Green.  |   |
|         | 58 22                | 20 0 45      | 3 9         |                                     | ☉'s U. L.<br>☉'s L. L.   |   |
|         | 1 12                 | 20 3 44      | 6 10::      |                                     | ☉'s L. L.<br>Mr. Green.  |   |
| ♀ — 7.  | 49 24                | 2 46 51      | 44 26::     | 23 55 19, 8                         | ☉'s L. L.<br>☉'s U. L.<br>☉'s U. L.  |   |
|         | 52 13                | 2 49 50      | 47 25       |                                     | ☉'s L. L.<br>Mr. Green.  |   |
|         | 47 44½               | 19 49 57     | 52 5        |                                     | ☉'s U. L.<br>☉'s L. L.   |   |
|         | Cloudy.              | 19 52 36     | 54 40       |                                     | ☉'s L. L.<br>Mr. Green.  |   |
| 24 — 8. | 59 57                | 3 57 41      | Cloudy.     | 23 55 11, 0                         | ☉'s L. L.<br>☉'s U. L.<br>☉'s U. L.  |   |
|         | 2 34                 | 4 0 20       | 58 14       |                                     | ☉'s L. L.<br>Mr. Green.  |   |
|         | 50 00                | 21 53 2      | 56 4        |                                     | ☉'s U. L.<br>☉'s L. L.   | Mr. Green.  |
|         | 53 35                | 21 56 47     | 59 48       |                                     | ☉'s L. L.<br>Mr. Green.  |   |
| ♀ — 9.  | 56 11                | 1 53 2       | 50 0        | 23 54 56, 1                         | ☉'s L. L.<br>☉'s U. L.<br>☉'s U. L.  |   |
|         | 59 49                | 1 56 44      | 53 46       |                                     | ☉'s L. L.<br>Mr. Green.  |   |
| ♂ — 10. | 57 43                | 21           | 8 30        |                                     | ☉'s U. L.<br>☉'s L. L.   |   |
|         | 1 32                 | 22           |             |                                     | ☉'s L. L.<br>Mr. Green.  |   |
| ☉ — 11. |                      |              |             | 23 54 42, 3                         | ☉'s L. L.<br>☉'s U. L.<br>☉'s U. L.  |   |
|         | 51 38                | 1            |             |                                     | ☉'s L. L.<br>Mr. Green.  |   |
|         | 52 56                | 19 55 33     |             |                                     | ☉'s U. L.<br>☉'s L. L.   |   |
|         | 56 36                | 19 57 52     |             |                                     | ☉'s L. L.<br>Mr. Green.  |   |
| D — 12. |                      |              |             | 23 54 35, 9                         | ☉'s L. L.<br>☉'s U. L.<br>☉'s U. L.  | Mr. Green.  |
|         | 56 14                | 3 53 35      | 20 6        |                                     | ☉'s L. L.<br>☉'s U. L.   |   |
|         | 14 52                | 21 17 34     |             |                                     | ☉'s U. L.<br>☉'s L. L.   |   |
|         | 18 2                 | 21 20 45     |             |                                     | ☉'s L. L.<br>Mr. Green.  |   |
| ♂ — 13. |                      |              |             | 23 54 31, 8                         | ☉'s L. L.<br>☉'s L. L.   |   |
|         | 30 59                | 2 28 15      |             |                                     |  |   |

## ASTRONOMICAL OBSERVATIONS.

| 1769.      | Times by the Clock. |              |             | Time of Apparent<br>Noon by the<br>Clock. | Phenomenon<br>and<br>Observer. | REMARKS. |
|------------|---------------------|--------------|-------------|---|--------------------------------|----------|
|            | Lower Wire.         | Middle Wire. | Upper Wire. |   |                                |          |
|            | " "                 | H " "        | " "         |   |                                |          |
| ♂ June 13. | 34 10               | 2 31 28      | 28 54       |   | ☉'s U. L.                      |          |
|            | 34 3                | 20 36 31     | 38 49       |   | ☉'s U. L.                      |          |
|            | 36 57               | 20 39 23     | 41 40       |   | ☉'s L. L.                      |          |
| ♂ — 14.    | 11 45               | 3 9 21       |             | 23 54 22, 1                               | Mr. Green.                     |          |
|            | 14 37               | 3 12 10      | 9 54        |   | ☉'s L. L.                      |          |
| ♀ — 16.    | 15 31               | 20 17 52     |             |   | ☉'s U. L.                      |          |
|            | 18 15               | 20 20 36     | 22 47       |   | ☉'s U. L.                      |          |
|            | 29 32               | 20 31 59     | 34 16       |   | ☉'s L. L.                      |          |
|            |                     | 20 34 48     | 37 5        |   | ☉'s U. L.                      |          |
| ♂ — 17.    | 15 33::             | 3 13 6       |             | 23 53 58, 1                               | Mr. Green.                     |          |
|            |                     | 3 15 55:     | 13 40;      |   | ☉'s L. L.                      |          |
|            | 29 41               | 3            | 25 7        |   | ☉'s U. L.                      |          |
|            |                     | 3 30 4       | 27 52       |   | ☉'s L. L.                      |          |
|            | 13 48               | 21 16 32     | 19 04       |   | ☉'s U. L.                      |          |
|            | 16 59               | 21 19 42     | 22 17       |   | ☉'s U. L.                      |          |
| ☉ — 18.    | 30 39               | 2 27 55      | 25 20       | 23 53 48, 9                               | Mr. Green.                     |          |
|            | 33 48               | 2 31 5       | 28 32       |   | ☉'s L. L.                      |          |
|            | 52 55               | 20 55 28     | 57 49       |   | ☉'s U. L.                      |          |
|            | 55 55               | 20 58 25     | 0 50        |   | ☉'s U. L.                      |          |
| ♂ — 19.    | 51 30               | 2 48 57      | 46 33       | 23 53 42, 0                               | Mr. Green.                     |          |
|            | 54 30               |              | 49 34       |   | ☉'s L. L.                      |          |
|            | 13 26               | 20 15 47     | 18 0        |   | ☉'s U. L.                      |          |
|            | 16 11               | 20 18 33     | 20 47       |   | ☉'s U. L.                      |          |
| ♂ — 20.    | 31 0                | 3 28 38      | 26 25       | 23 53 35, 6                               | Mr. Green.                     |          |
|            | 33 45               | 3 31 24      | 29 11       |   | ☉'s L. L.                      |          |
|            | 49 1                | 19 51 15     | 53 22       |   | ☉'s U. L.                      |          |
|            | 51 38               | 19 53 54     | 56 1        |   | ☉'s U. L.                      |          |
| ♂ — 21.    | 55 12               | 3 52 55      | 50 49       | 23 53 24, 8                               | Mr. Green.                     |          |
|            | 57 50               | 3 55 35      | 53 27       |   | ☉'s L. L.                      |          |
|            | 25 23               | 20 27 47     |             |   | ☉'s U. L.                      |          |
|            | 28 12               | 20 30 36     | 32 53       |   | ☉'s U. L.                      |          |
| ♂ — 22.    |                     |              |             | 23 53 18, 2                               | Mr. Green.                     |          |
|            | 21 14               | 3            |             |   | ☉'s L. L.                      |          |
| ♀ — 23.    | 57 50               | 20 0 7       | 2 15        |   | ☉'s U. L.                      |          |
|            | 0 30                | 20 2 49      | 4 58        |   | ☉'s U. L.                      |          |
| ♂ — 24.    |                     |              |             | 23 53 0, 0                                | Mr. Green.                     |          |
|            | 45 31               | 3 43 12      | 41 5        |   | ☉'s L. L.                      |          |
|            | 48 10               | 3 45 54      | 43 46       |   | ☉'s U. L.                      |          |

# ASTRONOMICAL OBSERVATIONS.

33

| 1769.   | Times by the Clock. |              |             | Time of apparent Noon by the Clock. | Phenomenon and Observer. | REMARKS. |
|---|---------------------|--------------|-------------|-------------------------------------|--------------------------|----------|
|   | Lower Wire.         | Middle Wire. | Upper Wire. |                                     |                          |          |
|   | " "                 | H " "        | " " "       |                                     |                          |          |
| ½ June 24.  | 6 49                | 22 10 12     | 13 35       |                                     | ☉'s U. L.                |          |
| ☉ — 25.   | 10 50               | 22 14 27     | 17 50       |                                     | ☉'s L. L.                |          |
|   | 34 55               | 1 31 20      | 27 53       | 23 52 51, 7                         | Mr. Green.               |          |
| ☉ — 26.   | 39 00               | 1 35 31      | 32 10       |                                     | ☉'s L. L.                |          |
| ☉ — 26.   | 27 17               | 21 30 10     | 32 49       |                                     | ☉'s U. L.                |          |
| ☉ — 27.   | 30 39               | 21 33 31     | 36 15       |                                     | ☉'s U. L.                |          |
|   | 14 33               | 2 11 39      | 8 56        | 23 52 34, 1                         | ☉'s L. L.                |          |
| ½ July 1.   | 17 53               | 2 15 1       | 12 21       |                                     | Mr. Green.               |          |
| ☉ — 2.  | 2 29                | 20           | 6 56        |                                     | ☉'s L. L.                |          |
|   | 5 12                | 20 7 28      | 9 38        |                                     | ☉'s U. L.                |          |
|   |                     | 3            |             | 23 51 47, 5                         | ☉'s L. L.                |          |
|   | 41 10               | 3            |             |                                     | ☉'s U. L.                |          |
|   | 7 13                | 21 9 51      | 12 21       |                                     | ☉'s U. L.                |          |
| ☉ — 3.  | 10 19               | 21 13 0      | 15 31       |                                     | ☉'s L. L.                |          |
|   | 33 6                | 2 30 25      | 27 52       | 23 51 39, 7                         | Mr. Green.               |          |
|   | 36 10               | 2 33 34      | 31 2        |                                     | ☉'s L. L.                |          |
|   | 33 21               | 19 35 33     | 37 36       |                                     | ☉'s U. L.                |          |
| ☉ — 4.  | 35 55               | 19 38 7      | 40 13       |                                     | ☉'s U. L.                |          |
|   |                     | 4 4 57       | 2 50        | 23 51 29, 5                         | ☉'s L. L.                |          |
|   | 9 43                | 4 7 31       | 5 27        |                                     | Mr. Green.               |          |
| ☉ — 5.  | 29 44               | 19 31 57     | 34 1        |                                     | ☉'s L. L.                |          |
|   | 32 19               |              |             |                                     | ☉'s U. L.                |          |
| ☉ — 6.  |                     |              |             | 23 51 7, 6                          | ☉'s L. L.                |          |
|   | 10 3                | 4            |             |                                     | Mr. Green.               |          |
|   | 12 35               | 4 10 24      | 8 19        |                                     | ☉'s L. L.                |          |
| ☉ — 8.  |                     |              |             |                                     | ☉'s U. L.                |          |
| Mr. Green took down the Clock, Observatory, and Instruments; at which time the Pendulum vibrated 1° 55' each way from the perpendicular, and never vibrated less than 1° 50'. The Bob remained as it was when going at Greenwich; where it gained at the rate of 1' 45", 8 in 24 hours, from April 19th to July 18th, 1768. |                     |              |             |                                     |                          |          |

## An Account of the going of the Clock, deduced from the foregoing Observations.

| 1769.      | Time of apparent Noon by the Clock. | Mean Time of apparent Noon. | Clock too slow for mean Time. | Clock's Loss on M. T. between the Observa. | Interval between the Obs. | Daily Loss of the Clock. |
|------------|-------------------------------------|-----------------------------|-------------------------------|--|---------------------------|--------------------------|
|            | H. M. S.                            | H. M. S.                    | M. S.                         | M. S.                                      | Days.                     | S.                       |
| 8 May 10.  | 23 51 44, 8                         | 23 56 2, 8                  | 4 18, 0                       |  |                           |                          |
| 2 — 12.    | 23 50 58, 3                         | 23 55 59, 7                 | 5 1, 4                        | 0 43, 4                                    | 2                         | 21, 7                    |
| h — 13.    | 23 50 36, 7                         | 23 55 58, 9                 | 5 22, 2                       | 0 20, 8                                    | 1                         | 20, 8                    |
| o — 14.    | 23 50 13, 7                         | 23 55 58, 7                 | 5 45, 0                       | 0 22, 8                                    | 1                         | 22, 8                    |
| 8 — 17.    | 23 49 15, 0                         | 23 56 1, 4                  | 6 46, 4                       | 1 1, 4                                     | 3                         | 20, 5                    |
| 24 — 18.   | 23 48 56, 8                         | 23 56 3, 4                  | 7 6, 6                        | 0 20, 2                                    | 1                         | 20, 2                    |
| o — 21.    | 23 48 2, 6                          | 23 56 12, 5                 | 8 9, 9                        | 1 3, 3                                     | 3                         | 21, 1                    |
| 8 — 23.    | 23 47 29, 4                         | 23 56 21, 4                 | 8 52, 0                       | 0 42, 1                                    | 2                         | 21, 0                    |
| 8 — 24.    | 23 47 14, 1                         | 23 56 20, 6                 | 9 12, 5                       | 0 20, 5                                    | 1                         | 20, 5                    |
| 24 — 25.   | 23 47 1, 1                          | 23 56 32, 3                 | 9 31, 2                       | 0 18, 7                                    | 1                         | 18, 7                    |
| h — 27.    | 23 46 30, 6                         | 23 56 45, 2                 | 10 14, 6                      | 0 43, 4                                    | 2                         | 21, 7                    |
| o — 28.    | 23 46 20, 5                         | 23 56 52, 4                 | 10 31, 9                      | 0 17, 3                                    | 1                         | 17, 3                    |
| h — 29.    | 23 46 6, 5                          | 23 57 0, 2                  | 10 53, 7                      | 0 21, 8                                    | 1                         | 21, 8                    |
| 8 — 30.    | Put the Clock forward 10' 57"       |                             |                               | 0 19, 1                                    | 1                         | 19, 1                    |
|            | 23 56 52, 6                         | 23 57 8, 4                  | 0 15, 8                       |  |                           |                          |
| 8 — 31.    | 23 56 38, 9                         | 23 57 17, 1                 | 0 38, 2                       | 0 22, 4                                    | 1                         | 22, 4                    |
| 24 June 1. | 23 56 29, 1                         | 23 57 26, 2                 | 0 57, 1                       | 0 18, 9                                    | 1                         | 18, 9                    |
| 2 — 2.     | 23 56 18, 9                         | 23 57 35, 6                 | 1 16, 7                       | 0 19, 6                                    | 1                         | 19, 6                    |
| h — 3.     | 23 56 3, 2                          | 23 57 45, 5                 | 1 42, 3                       | 0 25, 6                                    | 1                         | 25, 6                    |
| o — 4.     | 23 55 53, 3                         | 23 57 55, 6                 | 2 2, 3                        | 0 20, 0                                    | 1                         | 20, 0                    |
| h — 5.     | 23 55 40, 8                         | 23 58 6, 1                  | 2 25, 3                       | 0 23, 0                                    | 1                         | 23, 0                    |
| 8 — 6.     | 23 55 31, 4                         | 23 58 17, 0                 | 2 45, 6                       | 0 20, 4                                    | 1                         | 20, 4                    |
| 8 — 7.     | 23 55 19, 8                         | 23 58 28, 2                 | 3 8, 4                        | 0 22, 8                                    | 1                         | 22, 8                    |
| 24 — 8.    | 23 55 11, 0                         | 23 58 39, 6                 | 3 28, 6                       | 0 20, 2                                    | 1                         | 20, 2                    |
| 8 — 9.     | 23 54 56, 1                         | 23 58 51, 2                 | 3 55, 1                       | 0 26, 5                                    | 1                         | 26, 5                    |
| o — 11.    | 23 54 42, 3                         | 23 59 14, 9                 | 4 32, 6                       | 0 37, 5                                    | 2                         | 18, 7                    |
| h — 12.    | 23 54 35, 9                         | 23 59 27, 1                 | 4 51, 2                       | 0 18, 6                                    | 1                         | 18, 6                    |
| 8 — 13.    | 23 54 31, 8                         | 23 59 39, 5                 | 5 7, 7                        | 0 16, 5                                    | 1                         | 16, 5                    |
| 8 — 14.    | 23 54 22, 1                         | 23 59 52, 0                 | 5 29, 9                       | 0 22, 2                                    | 1                         | 22, 2                    |
| h — 17.    | 23 53 58, 1                         | 0 0 30, 0                   | 6 31, 9                       | 1 2, 0                                     | 3                         | 20, 7                    |
| o — 18.    | 23 53 48, 9                         | 0 0 42, 8                   | 6 53, 9                       | 0 22, 0                                    | 1                         | 22, 0                    |
| h — 19.    | 23 53 42, 0                         | 0 0 55, 7                   | 7 13, 7                       | 0 19, 8                                    | 1                         | 19, 8                    |
| 8 — 20.    | 23 53 35, 6                         | 0 1 8, 6                    | 7 33, 0                       | 0 19, 3                                    | 1                         | 19, 3                    |
| 8 — 21.    | 23 53 24, 8                         | 0 1 21, 4                   | 7 56, 6                       | 0 23, 6                                    | 1                         | 23, 6                    |
| 24 — 22.   | 23 53 18, 2                         | 0 1 34, 2                   | 8 16, 0                       | 0 19, 4                                    | 1                         | 19, 4                    |
| h — 24.    | 23 53 0, 0                          | 0 1 59, 6                   | 8 59, 6                       | 0 43, 6                                    | 2                         | 21, 8                    |
| o — 25.    | 23 52 51, 7                         | 0 2 12, 2                   | 19 20, 5                      | 0 20, 9                                    | 1                         | 20, 9                    |
| 8 — 27.    | 23 52 34, 1                         | 0 2 37, 1                   | 10 3, 0                       | 0 42, 5                                    | 2                         | 21, 2                    |
| o July 2.  | 23 51 47, 5                         | 0 3 36, 2                   | 11 48, 7                      | 1 45, 7                                    | 5                         | 21, 1                    |
| h — 3.     | 23 51 39, 7                         | 0 3 47, 2                   | 2 7, 5                        | 0 18, 8                                    | 1                         | 18, 8                    |
| 8 — 4.     | 23 51 29, 5                         | 0 3 58, 0                   | 12 28, 5                      | 0 21, 0                                    | 1                         | 21, 0                    |
| 24 — 6.    | 23 51 7, 6                          | 0 4 18, 6                   | 13 11, 0                      | 0 42, 5                                    | 2                         | 21, 2                    |

The mean of these 40 results is 20", 82, which may be taken for the clock's loss each day, on mean time, while it was going at this place: but if the first and last day's observations be compared together, taking in, at the same time, the 10' 57" which the clock was put forward on the 29th of May, the total loss, in the 57 days it was going, will be 19' 50", or 20", 88 per day.



OBSERVATIONS of the ECLIPSES of JUPITER'S SATELLITES,  
With Reflecting Telescopes of 2 feet focus, magnifying power 95.

| 1769.     | Time, by the<br>Clock. | Apparent<br>Time. | Time at Green-<br>wich by Naut.<br>Almanac. | Long. W. of<br>Greenwich,<br>in Time. | PHENOMENA AND OBSERVER.           |             |
|-----------|------------------------|-------------------|---|---------------------------------------|-----------------------------------|-------------|
|           | H ' "                  | H ' "             | H ' "                                       | H ' "                                 |                                   |             |
| ♀ May 10. | 16 2 30                | 16 11 1           | 26 5 8                                      | 9 54 7                                | Emerfion 24's first Satellite.    | Mr. Green.  |
| ♀ — 12.   | 16 3 30                | 16 12 1           | 26 5 8                                      | 9 53 7                                | Ditto.                            | Capt. Cook. |
| ♀ — 12.   | 10 27 55               | 10 37 6           | 20 33 50                                    | 9 56 44                               | Ditto.                            | Mr. Green.  |
| ♀ — 27.   | 10 28 5                | 10 37 16          | 20 33 50                                    | 9 56 34                               | Ditto.                            | Capt. Cook. |
| ♀ — 27.   | 11 44 4                | 11 57 38          |   |                                       | Emerfion 24's second Satellite.   | Mr. Green.  |
| ♀ — 27.   | 11 44 5                | 11 57 39          |   |                                       | Ditto.                            | Capt. Cook. |
| ♀ — 27.   | 11 47 15               | 12 0 50           |   |                                       | Emerfion of 24's third Satellite. | Mr. Green.  |
| ♀ — 27.   | 11 48 8                | 12 1 43           |   |                                       | Ditto.                            | Capt. Cook. |
| ♂ June 4. | 10 41 19               | 10 45 31          | 20 44 39                                    | 9 59 8                                | Emerfion 24's first Satellite.    | Mr. Green.  |
| ♂ — 13.   | 10 41 28               | 10 45 40          | 20 44 39                                    | 9 58 59                               | Ditto.                            | Capt. Cook. |
| ♂ — 13.   | 7 2 45                 | 7 8 16            | 17 6 31                                     | 9 58 15                               | Ditto.                            | Mr. Green.  |
| ♂ — 18.   | 7 2 45                 | 7 8 16            | 17 6 31                                     | 9 58 15                               | Ditto.                            | Capt. Cook. |
| ♂ — 18.   | 14 27 21               | 14 33 36          | 24 31 41                                    | 9 58 5                                | Ditto.                            | Mr. Green.  |
| ♂ — 18.   | 14 28 9                | 14 34 24          | 24 31 41                                    | 9 57 17                               | Ditto.                            | Capt. Cook. |
| ♂ — 20.   | 8 55 15                | 9 1 43            | 19 0 2                                      | 9 58 19                               | Ditto.                            | Mr. Green.  |
| ♀ — 21.   | 8 46 45                | 8 53 23           |   |                                       | Emerfion 24's second Satellite.   | Mr. Green.  |
| ♀ — 21.   | 8 47 44                | 8 54 22           |   |                                       | Ditto.                            | Capt. Cook. |
| ♂ — 27.   | 10 48 45               | 10 56 15          | 20 53 43                                    | 9 57 28                               | Emerfion 24's first Satellite.    | Mr. Green.  |
| ♂ July 4. | 12 42 40               | 12 51 16          | 22 47 33                                    | 9 56 17                               | Ditto.                            | Mr. Green.  |
| ♀ — 6.    | 7 9 20                 | 7 18 16           | 17 16 5                                     | 9 57 49                               | Ditto.                            | Mr. Green.  |
| ♀ — 6.    | 7 9 25                 | 7 18 21           | 17 16 5                                     | 9 57 44                               | Ditto.                            | Capt. Cook. |

It may be proper to reject the observations which were made of the first Satellite, on the 10th and 12th of May, on account of Jupiter's proximity to his opposition with the Sun at these times: the mean of the others is  $9^h 57' 58''$ . But the same Satellite was observed to emerge, at Greenwich, with a six feet reflector at  $9^h 40' 56''$  on the 8th of June; and at  $9^h 50' 24''$  on the 1st of July, with a telescope similar to those which were used by Mr. Green and Capt. Cook. Dr. Maskelyne has found by experience, that  $20''$  ought to be allowed in these observations, on account of the superiority which the six feet reflector has over the two feet ones, and this will reduce the former of these times to  $9^h 41' 16''$ . The times of these two emerfions, put down in the Nautical Almanac, are  $9^h 41' 26''$ , and  $9^h 50' 37''$ ; consequently, the first of them was seen  $10''$  and the latter  $13''$  sooner than they are put down in the Almanac; the mean of the two is  $11''\frac{1}{2}$ ; which may be taken for the medium time, by which emerfions of the first Satellite were seen sooner about that time, with these telescopes, than they are put down in the Almanac. These  $11''\frac{1}{2}$  being subtracted from  $9^h 57' 58''$ , give  $9^h 57' 46''\frac{1}{2}$ ,  $= 149^\circ 26'\frac{1}{2}$ , for the longitude of Point Venus, west of Greenwich.

ECLIPSE of the MOON.

| 1769.      | Times by the<br>Clock. | Apparent<br>Time. | Distance of the Cusps. |                 | PHENOMENA AND OBSERVER.   |  |
|------------|------------------------|-------------------|------------------------|-----------------|---|--|
|            | H ' "                  | H ' "             | Parts of Micro.        | Parts of a Cir. |   |  |
| ♂ June 18. | H ' "                  | H ' "             | In. Pts. V.            | " "             | Beginning of the Eclipse. C. G.   |  |
|            | H ' "                  | H ' "             | In. Pts. V.            | " "             |   |  |
| ♂ June 18. | 8 18 5                 | 8 24 18½          |                        |                 | I have added $5''\cdot 7$ for the error of the micrometer in reducing these measures. It results from measures of $\frac{1}{2}$ 's diameter taken on the 20th and 21st. |  |
|            | 9 1 51                 | 9 8 5             | 4 15 11                | 29 47,8         |   |  |
|            | 9 7 24                 | 9 13 38           | 4 15 12                | 29 48,7         |   |  |
|            | 9 13 55                | 9 20 9            | 4 15 4                 | 29 41,8         |   |  |
|            | 9 23 54                | 9 30 8            | 3 80 6                 | 27 13,9         |   |  |
|            | 11 52 10               | 11 58 24½         |                        |                 | End of the eclipse. Capt. Cook.   |  |
|            | 11 52 30               | 11 58 44½         |                        |                 | Ditto. - - - - - Mr. Green.   |  |
|            | 11 55 10               | 12 1 24½          |                        |                 | The D clear of the penumbra. Capt. Cook.  |  |
|            | 11 55 37               | 12 1 51½          |                        |                 | Ditto. - - - - - Mr. Green.   |  |

## ASTRONOMICAL OBSERVATIONS.

| 1769.     | Time by the Watch. | Alt. or Zen. Dist. ☉'s L. or *. | Moon's Alt. or Zen. Dist. | Dist. ♀'s L. from ☉ or *. | Ship's Latitude N. | Longitude | Barometer | Thermometer | Wind | Remarks |
|-----------|--------------------|---------------------------------|---------------------------|---------------------------|--------------------|-----------|-----------|-------------|------|---------|
| H         | "                  | "                               | "                         | "                         | "                  | "         | "         | "           | "    | "       |
| h May 13. | Noon.              | 53 42 0                         |                           |                           | 17 28 50           |           |           |             |      |         |
|           | 3 47 38            | 21 20 20                        | 52 55 U.                  | 106 2 00                  |                    | 149 30    |           |             |      |         |
|           | 3 47 38            | 21 20 20                        | 52 55 U.                  | 106 2 5                   |                    | 149 30    |           |             |      |         |
|           | 3 58 28            | 19 4 20                         | 50 31½ U.                 | 106 7 00                  |                    | 150 28    |           |             |      |         |
|           | 3 58 28            | 19 4 20                         | 50 31½ U.                 | 106 6 5                   |                    | 149 52    |           |             |      |         |
|           | 4 7 36             | 17 5 20                         | 48 31½ U.                 | 106 10 30                 |                    | 150 41    |           |             |      |         |
|           | 4 7 36             | 17 5 20                         | 48 31½ U.                 | 106 10 5                  |                    | 150 28    |           |             |      |         |
| ♂ — 16.   | 9 51 16            | 27 57 30                        | 80 8 L.                   | 52 53 45                  |                    | 148 5     |           |             |      |         |
|           | 9 52 57            | 27 27 40                        | 79 54 L.                  | 52 55 00                  |                    | 148 8     |           |             |      |         |
|           | 10 2 35            | 24 56 20                        | 77 52 L.                  | 52 58 10                  |                    | 149 23    |           |             |      |         |
|           | 10 2 35            | 24 56 20                        | 77 52 L.                  | 52 58 55                  |                    | 149 45    |           |             |      |         |
|           | 10 12 57           | 22 32 20                        | 75 21 L.                  | 53 1 5                    |                    | 149 20    |           |             |      |         |
|           | 10 12 57           | 22 32 20                        | 75 21 L.                  | 53 0 55                   |                    | 149 21    |           |             |      |         |
|           | 10 41 13½          | 25 58 40                        | 68 56 L.                  | 46 46 35                  |                    | 149 11    |           |             |      |         |
|           | 10 44 26           | 25 17 17                        | 68 14 L.                  | 46 44 25                  |                    | 149 15    |           |             |      |         |
|           | 10 59 0            | 22 7 40                         | 64 55 L.                  | 46 40 00                  |                    | 149 15    |           |             |      |         |
|           | 10 59 0            | 22 7 40                         | 64 55 L.                  | 46 39 40                  |                    | 149 23    |           |             |      |         |
|           | 11 9 48            | 19 51 00                        | 62 27 L.                  | 46 37 0                   |                    | 149 43    |           |             |      |         |
|           | 11 9 48            | 19 51 00                        | 62 27 L.                  | 46 35 20                  |                    | 149 51    |           |             |      |         |
| ♀ — 17.   | 8 5 46             | 47 26 20                        | 26 53 U.                  | 64 29 30                  |                    | 149 50    |           |             |      |         |
|           | 8 21 54            | 44 33 00                        | 23 36 U.                  | 64 34 55                  |                    | 150 31    |           |             |      |         |
|           | 8 38 4             | 43 4 40                         | 21 12 U.                  | 64 38 10                  |                    | 150 45    |           |             |      |         |
| ♂ — 18.   | Noon.              | 36 58 12                        |                           |                           |                    |           |           |             |      |         |
| ♀ — 26.   | 21 28 52           | 38 16 00                        | 26 50 U.                  | 100 37 5                  | 17 28 50           | 148 8     |           |             |      |         |
|           | 21 28 52           | 38 16 00                        | 26 50 U.                  | 100 36 55                 |                    | 148 13    |           |             |      |         |
|           | 21 42 29           | 40 25 20                        | 24 1 U.                   | 100 30 45                 |                    | 148 26    |           |             |      |         |
|           | 21 42 29           | 40 25 20                        | 24 1 U.                   | 100 31 00                 |                    | 148 18    |           |             |      |         |
|           | 21 55 34           | 42 19 40                        | 20 59 U.                  | 100 24 40                 |                    | 148 34    |           |             |      |         |
|           | 21 55 34           | 42 19 40                        | 20 59 U.                  | 100 24 52                 |                    | 148 28    |           |             |      |         |
| h — 27.   | Noon.              | 38 39 10                        |                           |                           |                    |           |           |             |      |         |
| ☉ — 28.   | Noon.              | 38 50 00                        |                           |                           | 17 27 52           |           |           |             |      |         |
|           | Noon.              | 50 41 00                        |                           |                           | 17 29 11           |           |           |             |      |         |
|           | 22 24 35           | 45 50 00                        | 32 13 U.                  | 75 26 30                  | 17 29 33           | 149 54    |           |             |      |         |
|           | 22 29 51           | 46 24 20                        | 31 2 U.                   | 75 24 50                  |                    | 149 42    |           |             |      |         |
|           | 22 39 19           | 47 21 20                        | 28 53 U.                  | 75 21 10                  |                    | 149 31    |           |             |      |         |
|           | 22 44 48           | 47 52 20                        | 27 37 U.                  | 75 19 20                  |                    | 149 20    |           |             |      |         |
|           | 22 51 33           | 48 22 20                        | 26 4 U.                   | 75 16 40                  |                    | 149 13    |           |             |      |         |
| h — 29.   | Noon.              | 38 59 00                        |                           |                           | 17 29 1            |           |           |             |      |         |
|           | Noon.              | 50 33 00                        |                           |                           | 17 28 54           |           |           |             |      |         |

# ASTRONOMICAL OBSERVATIONS.

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| 1769.   | Time by the Clock. | Alt. or Zen. Dist. $\odot$ 's L. or *. | Moon's Alt. or Zen. Dist. | Diff. $\odot$ 's L. from $\odot$ or *. | Ship's Latitude S. | Long. W. of Greenwich. | Thermo. | Oberv. | PHENOMENA AND REMARKS.              |
|---------|--------------------|--|---------------------------|--|--------------------|------------------------|---------|--------|-------------------------------------|
|         | H ' "              | " ' "                                  | " ' "                     | " ' "                                  | " ' "              | " ' "                  |         |        |                                     |
| May 29. | 17 49 32           | 43 12 20                               | 52 50 L.                  | 67 5 00                                |                    | 149 2                  |         | G.     | $\delta$ & $\alpha$ Aquil.          |
|         | 17 56 39           | 41 56 20                               | 54 3 L.                   | 67 6 57                                |                    | 149 6 $\frac{1}{2}$    |         | G.     | $\delta$ & Ditto.                   |
|         | 22 10 40           | 42 36 20                               | 45 34 U.                  | 62 34 20                               |                    | 149 42 $\frac{1}{2}$   |         | G.     | $\delta$ & $\odot$ .                |
|         | 22 18 3            | 43 36 20                               | 45 2 U.                   | 62 31 50                               |                    | 149 28 $\frac{1}{2}$   |         | G.     | $\delta$ & $\odot$ .                |
|         | 22 25 28           | 44 29 00                               | 42 28 U.                  | 62 29 10                               |                    | 149 37 $\frac{3}{8}$   |         | G.     | $\delta$ & $\odot$ .                |
|         | 22 30 46           | 45 10 20                               | 41 25 U.                  | 62 26 50                               |                    | 149 47 $\frac{1}{8}$   |         | G.     | $\delta$ & $\odot$ .                |
|         | 22 35 43           | 45 48 40                               | 40 24 $\frac{1}{2}$ U.    | 62 25 20                               |                    | 149 38 $\frac{1}{8}$   |         | G.     | $\delta$ & $\odot$ .                |
| — 30.   | Noon.              | 39 8 12                                |                           |  | 17 29 27           |                        |         | G.     | Merid. Zen. Dist. $\odot$ 's U. L.  |
|         | Noon.              | 50 23 30                               |                           |  | 17 29 38           |                        |         | G.     | Merid. Altitude. $\odot$ 's L. L.   |
| — 31.   | Noon.              | 39 16 21                               |                           |  | 17 29 13           |                        |         | G.     | Merid. Zen. Dist. $\odot$ 's U. L.  |
| June 7. | Noon.              | 40 3 32                                |                           |  | 17 28 29           |                        |         | G.     | Ditto.                              |
| 8.      | Noon.              | 40 9 00                                |                           |  | 17 28 42           |                        |         | G.     | Ditto.                              |
| 9.      | Noon.              | 40 13 00                               |                           |  | 17 27 51           |                        |         | G.     | Ditto.                              |
| 10.     | Noon.              | 40 17 00                               |                           |  | 17 27 24           |                        |         | G.     | Ditto.                              |
| 11.     | Noon.              | 40 21 00                               |                           |  | 17 27 21           |                        |         | G.     | Ditto.                              |
|         |                    | 37 51 57                               |                           |  | 17 29 16           |                        |         | G.     | Mer. Zen. Dist. Arc-turus.          |
| — 12.   | Noon.              | 40 26 4                                |                           |  | 17 28 46           |                        |         | G.     | Merid. Zen. Dist. $\delta$ 's U. L. |
|         | 4 18 53            | 13 33 00                               | 42 52 U.                  | 111 34 20                              |                    | 151 1 $\frac{1}{2}$    |         | G.     | $\delta$ & $\odot$ .                |
|         | 4 28 32            | 11 34 00                               | 40 37 U.                  | 111 35 40                              |                    | 150 22 $\frac{1}{4}$   |         | G.     | $\delta$ & $\odot$ .                |
|         | 4 37 57            | 9 36 20                                | 38 24 U.                  | 111 37 50                              |                    | 150 21 $\frac{1}{4}$   |         | G.     | $\delta$ & $\odot$ .                |
| — 13.   | Noon.              | 40 29 00                               |                           |  | 17 28 28           |                        |         | G.     | Merid. Zen. Dist. $\odot$ 's U. L.  |
|         | 3 16 21            | 25 56 40                               | 66 39 $\frac{1}{2}$ U.    | 122 20 45                              |                    | 148 54 $\frac{1}{2}$   |         | G.     | $\delta$ & $\odot$ .                |
|         | 3 22 54            | 24 35 50                               | 65 3 $\frac{1}{2}$ U.     | 122 24 30                              |                    | 149 32 $\frac{1}{4}$   |         | G.     | $\delta$ & $\odot$ .                |
|         | 3 29 43            | 23 23 40                               | 63 33 $\frac{1}{2}$ U.    | 122 26 50                              |                    | 149 18 $\frac{3}{4}$   |         | G.     | $\delta$ & $\odot$ .                |
|         | 3 44 36            | 20 25 20                               | 60 1 $\frac{1}{2}$ U.     | 122 32 10                              |                    | 149 10 $\frac{1}{4}$   |         | G.     | $\delta$ & $\odot$ .                |
|         | 3 50 49            | 19 7 00                                | 58 34 $\frac{1}{2}$ U.    | 122 35 00                              |                    | 149 31 $\frac{1}{4}$   |         | G.     | $\delta$ & $\odot$ .                |
|         |                    | 27 32 30                               |                           |  | 17 28 57           |                        |         | G.     | Mer. Z. D. $\gamma$ Aquilæ.         |
|         |                    | 25 44 50                               |                           |  | 17 28 47           |                        |         | G.     | Ditto. $\alpha$ Aquilæ.             |
|         |                    | 23 19 22                               |                           |  | 17 28 59           |                        |         | G.     | Ditto. $\beta$ Aquilæ.              |
| — 15.   | Noon.              | 40 34 00                               |                           |  | 17 28 15           |                        |         | G.     | Merid. Zen. Dist. $\odot$ 's U. L.  |
| — 17.   | Noon.              | 40 36 45                               |                           |  | 17 27 26           |                        |         | G.     | Ditto.                              |
|         | Noon.              | 48 54 00                               |                           |  | 17 28 37           |                        |         | G.     | Merid. Altitude. $\odot$ 's L. L.   |
|         | 10 9 35            | 48 4 40                                | 14 26 $\frac{2}{3}$ U.    | 55 34 50                               |                    | 149 5 $\frac{1}{2}$    |         | G.     | $\delta$ & Spi. $\eta$ .            |
|         | 10 9 35            | 48 4 40                                | 14 26 $\frac{2}{3}$ U.    | 55 35 10                               |                    | 149 15 $\frac{1}{8}$   |         | G.     | $\delta$ & Spi. $\eta$ .            |
|         | 10 20 15           | 45 31 40                               | 12 14 U.                  | 55 38 20                               |                    | 149 22 $\frac{1}{8}$   |         | C.     | $\delta$ & Spi. $\eta$ .            |
|         | 10 20 15           | 45 31 40                               | 12 14 U.                  | 55 38 10                               |                    | 149 17 $\frac{1}{8}$   |         | G.     | $\delta$ & Spi. $\eta$ .            |
|         | 10 28 35           | 43 35 00                               | 10 36 $\frac{1}{3}$ U.    | 55 41 30                               |                    | 149 47 $\frac{1}{8}$   |         | C.     | $\delta$ & Spi. $\eta$ .            |
|         | 10 28 35           | 43 35 00                               | 10 36 $\frac{1}{3}$ U.    | 55 41 40                               |                    | 149 52 $\frac{1}{4}$   |         | G.     | $\delta$ & Spi. $\eta$ .            |



| 1769             | Time by the Clock, |    | Alt. or Zen. Diff. $\odot$ 's L. or $\ast$ . | Moon's Alt. or Zen. Diff. | Diff. $\gamma$ 's L. from $\odot$ or $\ast$ . | Ship's Latitude S. | Long. W. of Greenwich. | Thermo. | Observ.   | PHENOMENA AND REMARKS.                              |
|------------------|--------------------|----|--|---------------------------|---|--------------------|------------------------|---------|-----------|---|
|                  | H                  | "  | "  | "                         | "   | "                  | "                      | "       | "         |   |
| June 24.         | 21                 | 50 | 28   | 39 12 20                  | 77 31 $\frac{1}{2}$ U.                        | 105 7 30           | 149 8 $\frac{5}{8}$    |         | G.        | $\gamma$ & $\odot$ . } $\gamma$ 's Zen. D.          |
|                  | 21                 | 55 | 14   | 39 52 00                  | 78 37 $\frac{1}{2}$ U.                        | 105 5 20           | 148 58 $\frac{1}{8}$   |         | G.        | $\gamma$ & $\odot$ . } observ. with                 |
|                  | 21                 | 59 | 34   | 40 28 20                  | 79 36 $\frac{3}{4}$ U.                        | 105 3 3            | 148 58 $\frac{7}{8}$   |         | G.        | $\gamma$ & $\odot$ . } the Afr. Qu.                 |
| $\gamma$ — 25.   |                    |    |  | 42 22 00                  |   |                    |                        |         | G.        | Mer. Z. D. $\alpha$ Centauri.                       |
| $\gamma$ — 26.   | 21                 | 46 | 12   | 38 41 20                  | 30 46 $\frac{1}{2}$ U.                        | 79 47 02           | 149 23 $\frac{1}{2}$   |         | G.        | $\gamma$ and $\odot$ .                              |
|                  | 21                 | 54 | 20   | 39 53 40                  | 29 5 U.                                       | 79 43 50           | 149 22 $\frac{1}{2}$   |         | G.        | $\gamma$ and $\odot$ .                              |
|                  | 21                 | 59 | 42   | 40 39 00                  | 27 57 $\frac{1}{2}$ U.                        | 79 41 50           | 149 17 $\frac{3}{4}$   |         | G.        | $\gamma$ and $\odot$ .                              |
|                  | 22                 | 4  | 3  | 41 12 20                  | 27 2 U.                                       | 79 39 40           | 149 28                 |         | G.        | $\gamma$ and $\odot$ .                              |
|                  | 22                 | 7  | 48   | 41 41 40                  | 26 14 $\frac{1}{2}$ U.                        | 79 38 30           | 149 17 $\frac{1}{2}$   |         | G.        | $\gamma$ and $\odot$ .                              |
| $\delta$ — 27.   | Noon.              |    | 40 30 00                                     |                           |   |                    | 17 27 33               |         | G.        | Mer. Z. Diff. $\odot$ 's U. L.                      |
|                  |                    |    | 41 44 32                                     |                           |   |                    | 17 29 48               |         | G.        | — $\beta$ Centauri.                                 |
|                  |                    |    | 56 3 00                                      |                           |   |                    | 17 29 32               |         | G.        | — $\alpha$ Lyra.                                    |
|                  | 20                 | 36 | 16   | 26 56 00                  | 49 59 $\frac{1}{2}$ U.                        | 66 55 40           | 149 13 $\frac{3}{8}$   |         | G.        | $\gamma$ & $\odot$ .                                |
|                  | 20                 | 44 | 7  | 28 23 20                  | 48 53 $\frac{1}{2}$ U.                        | 66 52 00           | 149 43 $\frac{3}{8}$   |         | G.        | $\gamma$ & $\odot$ .                                |
|                  | 20                 | 50 | 31   | 29 31 40                  | 47 57 $\frac{3}{4}$ U.                        | 66 50 50           | 149 17 $\frac{1}{8}$   |         | G.        | $\gamma$ & $\odot$ .                                |
|                  | 20                 | 55 | 31   | 30 25 20                  | 47 11 $\frac{1}{2}$ U.                        | 66 48 57           | 149 23                 |         | G.        | $\gamma$ & $\odot$ .                                |
|                  | 20                 | 59 | 52   | 31 9 40                   | 46 31 $\frac{1}{2}$ U.                        | 66 47 10           | 149 30 $\frac{1}{4}$   |         | G.        | $\gamma$ & $\odot$ .                                |
| $\delta$ — 28.   |                    |    |  | 27 32 12                  |   |                    | 17 28 37               |         |           | Mer. Z. D. $\gamma$ Aquila.                         |
|                  |                    |    |  | 25 44 30                  |   |                    | 17 28 24               |         |           | — $\alpha$ Aquila.                                  |
|                  |                    |    |  | 23 19 00                  |   |                    | 17 28 35               |         |           | — $\beta$ Aquila.                                   |
|                  |                    |    |  | 39 56 16                  |   |                    | 17 29 43               |         |           | — $\alpha$ Pavonis.                                 |
|                  |                    |    |  | 61 54 20                  |   |                    | 17 28 10 $\frac{1}{2}$ |         |           | — $\alpha$ Cygni.                                   |
| $\eta$ — 30.     | 21                 | 13 | 57   | 33 43 20                  | 40 28 C.                                      | 39 6 10            | 149 48 $\frac{1}{4}$   |         | G.        | $\gamma$ & $\odot$ . } The Z. Diff.                 |
|                  | 21                 | 23 | 52   | 35 24 0                   | 40 45 $\frac{3}{4}$ C.                        | 39 2 7             | 150 9 $\frac{3}{4}$    |         | G.        | $\gamma$ & $\odot$ . } $\gamma$ 's C. with          |
|                  | 21                 | 30 | 12   | 36 25 20                  | 41 0 $\frac{1}{2}$ C.                         | 39 0 10            | 150 6 $\frac{1}{8}$    |         | G.        | $\gamma$ & $\odot$ . } Afr. Quad.                   |
| $\delta$ July 4. |                    |    |  | 37 52 00                  |   |                    | 17 29 15               |         | G.        | Mer. Z. Diff. Arcturus.                             |
| $\delta$ — 18.   | Noon.              |    | 52 13  |                           |   |                    | 16 40                  |         | G.        | M. Alt. $\odot$ 's L. L. Dip. 2' 10". In O-whare H. |
| $\odot$ — 23.    | Noon.              |    | 53 6 $\frac{1}{2}$                           |                           |   |                    | 16 47                  |         | G.        | Ditto. In Oopoa Har.                                |
|                  | 20                 | 2  | 42   | 19 42                     | 29 49 C.                                      | 109 40 40          | 150 53 $\frac{3}{4}$   |         | $\ast$ G. | $\gamma$ & $\odot$ . } Of the No.                   |
|                  | 20                 | 9  | 39   | 21 7 $\frac{2}{3}$        | 28 19 $\frac{1}{4}$ C.                        | 109 38 47          | 150 33 $\frac{3}{4}$   |         | $\ast$ G. | $\gamma$ & $\odot$ . } entrance in-                 |
|                  | 20                 | 15 | 18   | 22 19 $\frac{1}{2}$       | 27 3 $\frac{1}{2}$ C.                         | 109 36 20          | 150 39 $\frac{1}{2}$   |         | $\ast$ G. | $\gamma$ & $\odot$ . } to Oopoa                     |
|                  | 20                 | 19 | 57   | 23 19                     | 25 59 $\frac{1}{2}$ C.                        | 109 34 0           | 150 50 $\frac{1}{4}$   |         | $\ast$ G. | $\gamma$ & $\odot$ . } Harbour in                   |
| $\gamma$ — 24.   | Noon.              |    |  |                           |   |                    | 151 20                 |         |           | Latitude by account.                                |
|                  | 21                 | 57 | 59   | 38 48                     | 17 55 $\frac{3}{4}$ U.                        | 96 12 0            | 149 58                 |         | $\ast$ G. | $\gamma$ & $\odot$ . } Peak of Bo-                  |
|                  | 22                 | 6  | 45   | 40 22 $\frac{1}{3}$       | 15 58 U.                                      | 96 5 20            | 151 6 $\frac{1}{4}$    |         | $\ast$ G. | $\gamma$ & $\odot$ . } labola. W.                   |
|                  | 22                 | 15 | 17   | 41 41 $\frac{1}{3}$       | 14 13 $\frac{1}{2}$ U.                        | 96 1 30            | 151 8                  |         | $\ast$ G. | $\gamma$ & $\odot$ . } b. S. & N. P.                |
|                  | 22                 | 21 | 0  | 42 36                     | 12 59 $\frac{3}{4}$ U.                        | 95 59 20           | 150 50                 |         | $\ast$ G. | $\gamma$ & $\odot$ . } of Otaha S.                  |
| $\delta$ — 25.   | Noon.              |    |  |                           |   |                    | 151 14                 |         | G.        | $\gamma$ & $\odot$ . } W. b. W. P.                  |
| $\delta$ — 26.   | Noon.              |    |  |                           |   |                    | 16 26                  |         |           | Latitude observed.                                  |
|                  |                    |    |  |                           |   |                    |                        |         |           | Bolabola W. by S. N. P. of Otaha S. W. b. W.        |
|                  | 21                 | 20 | 46   | 39 33 $\frac{5}{8}$       | 35 43 $\frac{3}{4}$ U.                        | 69 42 30           | 151 9 $\frac{1}{2}$    |         | $\ast$ G. | $\gamma$ & $\odot$ . } O-Whare                      |
|                  |                    |    |  |                           |   |                    |                        |         |           | Har. S. 65° E.                                      |
|                  |                    |    |  |                           |   |                    |                        |         |           | Peak of Bo-   |
|                  |                    |    |  |                           |   |                    |                        |         |           | labola N.   |
|                  |                    |    |  |                           |   |                    |                        |         |           | 86 $\frac{1}{2}$ ° W. Do.                           |
|                  |                    |    |  |                           |   |                    |                        |         |           | of Otaha S.   |
|                  |                    |    |  |                           |   |                    |                        |         |           | 68 $\frac{1}{2}$ ° W. Oo-                           |
|                  |                    |    |  |                           |   |                    |                        |         |           | poa Har. S.   |
|                  |                    |    |  |                           |   |                    |                        |         |           | by comp. P.   |
|                  | 21                 | 26 | 6  | 40 24 $\frac{1}{2}$       | 34 47 $\frac{1}{2}$ U.                        | 69 41 40           | 150 42 $\frac{1}{2}$   |         | $\ast$ G. | $\gamma$ & $\odot$ .                                |

## ASTRONOMICAL OBSERVATIONS.

| 1769.      | Time by the Watch. | Alt. ☉'s L. L. or * | Moon's Altitude.       | Dist. ☉'s L. from ☉ or *. | Ship's Latit. S.    | Long. W. of Greenwich. | Thermo. | Obsev. | PHENOMENA AND REMARKS.  |
|------------|--------------------|---------------------|------------------------|---------------------------|---------------------|------------------------|---------|--------|---|
|            | H ' "              | ° ' "               | ° ' "                  | ° ' "                     | ° ' "               | ° ' "                  |         |        |   |
| 8 July 26. | 21 31 26           | 41 20 $\frac{1}{2}$ | 33 54 U.               | 69 39 30                  | 16 34 $\frac{1}{2}$ | 150 44 $\frac{1}{4}$   | *       | G.     | ☉ & ☉. { Owharre Harbour S. 65° E. Peak of Bolabola N. 86° $\frac{1}{2}$ W. Do. of Otaha S. 68° $\frac{1}{2}$ W. Oopoa Har. S. b. com. P. |
|            | 21 35 49           | 42 7 $\frac{1}{2}$  | 33 1 U.                | 69 37 50                  |                     | 150 47 $\frac{1}{2}$   | *       | G.     | ☉ & ☉.  |
|            | 21 40 23           | 42 50 $\frac{1}{2}$ | 32 17 $\frac{1}{2}$ U. | 69 35 50                  |                     | 150 55                 | *       | G.     | ☉ & ☉.  |
| 4 — 27.    | Noon.              | 54 10               |                        |                           | 16 36 $\frac{1}{2}$ | 151 16 $\frac{1}{2}$   | 77      |        | Ulietea from S. 6° W. to S. 50° W.  |
| 8 — 28.    | Noon.              |                     |                        |                           | 16 37               | 151 23                 | 76      |        | Otaha from N. N. W. to W. S. W. by com.   |
| 12 — 29.   | Noon.              | 54 47               |                        |                           | 16 28               | 151 32                 | 78      |        | Otaha from S. by E. to S. E. by E. $\frac{1}{4}$ E. by C.   |
| ☉ — 30.    | Noon.              | 54 49               |                        |                           | 16 40 $\frac{2}{3}$ | 151 37 $\frac{1}{2}$   | 78      |        | Bolabola N. 21 $\frac{1}{2}$ W. and Maurua N. 74° $\frac{1}{2}$ W. by compass.  |
| ☽ — 31.    | Noon.              | 55 7                |                        |                           | 16 37 $\frac{3}{4}$ | 151 34                 | 77      |        | Ulietea from N. 40° E. to S. 82° E. by com.   |
| 8 Aug. 1.  | Noon.              |                     |                        |                           |                     |                        | 77      |        |   |
| 8 — 2.     | Noon.              |                     |                        |                           |                     |                        | 76      |        |   |
| 24 — 3.    | Noon.              |                     |                        |                           |                     |                        | 78      |        |   |
| 8 — 4.     | Noon.              |                     |                        |                           |                     |                        | 79      |        | In Ohamaneno Harbour, on the west side of Ulietea.  |
| 12 — 5.    | Noon.              |                     |                        |                           |                     |                        | 77      |        |   |
| ☉ — 6.     | Noon.              |                     |                        |                           |                     |                        | 77      |        |   |
| ☽ — 7.     | Noon.              |                     |                        |                           |                     |                        | 77      |        |   |
| 8 — 8.     | Noon.              |                     |                        |                           |                     |                        | 76      |        |   |
|            | 1 39 50            | 49 48               | 36 42 $\frac{1}{4}$ C. | 84 59 30                  |                     | 152 24 $\frac{1}{2}$   | *       | G.     | ☉ & ☉. { In Ohama-  |
|            | 1 44 25            | 49 6                | 37 48 $\frac{3}{4}$ C. | 85 0 10                   |                     | 151 49 $\frac{1}{2}$   | *       | G.     | ☉ & ☉. { neno Harb.   |
|            | 1 48 23            | 48 33 $\frac{1}{2}$ | 38 39 $\frac{1}{2}$ C. | 85 1 10                   | 16 45 $\frac{1}{2}$ | 151 39 $\frac{3}{4}$   | *       | G.     | ☉ & ☉. { on the west  |
|            | 1 52 12            | 47 53               | 39 40 $\frac{1}{2}$ C. | 85 3 25                   |                     | 152 2                  | *       | G.     | ☉ & ☉. { side of Uli-   |
|            | 1 56 31            | 47 15 $\frac{1}{2}$ | 39 35 $\frac{1}{2}$ C. | 85 4 57                   |                     | 152 3 $\frac{3}{4}$    | *       | G.     | ☉ & ☉. { etea, Quar-  |
| 8 — 9.     | Noon.              |                     |                        |                           |                     |                        | 78      |        | ter Deck.   |
| 24 — 10.   | Noon.              | 56 54 $\frac{1}{2}$ |                        |                           | 17 35               | 151 41                 | 79      | G.     | ☉'s Merid. Altitude.  |
| 8 — 11.    | Noon.              |                     |                        |                           | 18 58               | 151 45                 | 78      | G.     | Latitude observed.  |
| 12 — 12.   | Noon.              | 54 52               |                        |                           | 20 13 $\frac{2}{3}$ | 151 36                 | 77      | G.     | ☉'s Merid. Altitude.  |
| ☉ — 13.    | Noon.              | 53 30               |                        |                           | 21 54               | 151 9                  | 77      | G.     | Ditto.  |
| ☽ — 14.    | Noon.              |                     |                        |                           | 22 26               | 150 55                 |         | G.     | Lat. obs. Oheteroa East true, dist. 2 leagues off shore.  |
| 8 — 15.    | Noon.              | 52 9                |                        |                           | 23 52 $\frac{1}{2}$ | 150 37                 |         | G.     | Merid. Alt. ☉'s L. L.   |
| 8 — 16.    | Noon.              | 51 20               |                        |                           | 25 0 $\frac{1}{2}$  | 150 19                 | 72      | G.     | Ditto.  |
| 24 — 17.   | Noon.              | 50 29               |                        |                           | 26 10 $\frac{5}{6}$ | 149 46                 | 67      | G.     | Ditto.  |
| 8 — 18.    | Noon.              | 50 11               |                        |                           | 26 48 $\frac{1}{3}$ | 149 42                 | 71      | G.     | Ditto.  |
| 12 — 19.   | Noon.              |                     |                        |                           | 27 40               | 149 6                  | 72      | G.     | Latitude observed.  |
| ☉ — 20.    | Noon.              | 49 15               |                        |                           | 28 23 $\frac{5}{6}$ | 148 25                 | 72      | G.     | Merid. Alt. ☉'s L. L.   |
| ☽ — 21.    | Noon.              |                     |                        |                           | 29 44               | 148 22                 | 71      | G.     | Latitude by account.  |



# ASTRONOMICAL OBSERVATIONS.

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| 1769.      | Time by the Watch. | Alt. ☉'s L.L. or *  | Moon's Altitude.       | Dist. ☽'s L. from ☉ or *. | Ship's Latit. S.    | Long. W. of Greenwich. | Thermo. | Oberv. | PHENOMENA AND REMARKS.  |
|------------|--------------------|---------------------|------------------------|---------------------------|---------------------|------------------------|---------|--------|-------------------------|
| H          | "                  | "                   | "                      | "                         | "                   | "                      | "       | "      | "                       |
| Aug. 22.   | Noon.              | 47 15               |                        |                           |                     |                        |         |        |                         |
| * — 23.    | Noon.              | 46 33               |                        |                           | 31 4 $\frac{1}{2}$  | 148 0                  | 69      | G.     | Merid. Altit. ☉'s L. L. |
| ☽ — 24.    | Noon.              |                     |                        |                           | 32 6 $\frac{2}{3}$  | 147 29                 | 66      | G.     | Ditto.                  |
| ☽ — 25.    | Noon.              | 47 0 $\frac{1}{2}$  |                        |                           | 32 44               | 147 00                 | 62      | G.     | Latitude by account.    |
| 22 8 8     |                    | 37 57 $\frac{2}{3}$ | 27 24 $\frac{1}{2}$ U. | 59 23 50                  | 32 20 $\frac{2}{3}$ | 147 22                 | 61      | G.     | Merid. Altit. ☉'s L. L. |
| 22 15 8    |                    | 38 53               | 26 36 $\frac{1}{2}$ U. | 59 21 10                  |                     | 147 2                  | *       | G.     | ☽ & ☉. } Very clear.    |
| 22 21 6    |                    | 39 37 $\frac{1}{2}$ | 25 53 $\frac{1}{2}$ U. | 59 18 50                  | 32 37               | 147 2 $\frac{3}{4}$    | *       | G.     | ☽ & ☉. } Observed on    |
| 22 27 35   |                    | 40 25 $\frac{2}{3}$ | 25 6 $\frac{2}{3}$ U.  | 59 16 55                  |                     | 147 7 $\frac{3}{4}$    | *       | G.     | ☽ & ☉. } the Quarter    |
| ☽ — 26.    | Noon.              | 47 2                |                        |                           |                     | 146 52 $\frac{1}{2}$   | *       | G.     | ☽ & ☉. } Deck.          |
| ☉ — 27.    | Noon.              | 46 27               |                        |                           | 32 40               | 147 20                 | 59      | G.     | Mer. Alt. ☉'s L.L. Q.D. |
| ☽ — 28.    | Noon.              |                     |                        |                           | 33 36               | 147 25                 |         | G.     | Ditto.                  |
| ☽ — 29.    | Noon.              | 43 46               |                        |                           | 35 34               | 147 27                 | 67      | G.     | Latitude by account.    |
| ☽ — 30.    | Noon.              | 42 46               |                        |                           | 37 9                | 147 30                 | 62      | G.     | Mer. Alt. ☉'s L.L. Q.D. |
| ☽ — 31.    | Noon.              | 41 58               |                        |                           | 38 21 $\frac{1}{2}$ | 147 20                 | 68      | G.     | Ditto.                  |
| ☽ Sept. 1. | Noon.              |                     |                        |                           | 39 31 $\frac{1}{4}$ | 147 16                 | 54      | G.     | Ditto.                  |
| ☽ — 2.     | Noon.              | 42 30               |                        |                           | 40 12               | 146 51                 | 48      | G.     | Latitude by account.    |
| ☉ — 3.     | Noon.              | 43 29               |                        |                           | 39 43               | 146 07                 | 50      | G.     | Mer. Alt. ☉'s L.L. Q.D. |
| ☽ — 4.     | Noon.              | 44 25               |                        |                           | 39 6                | 146 10                 | 50      | G.     | Ditto.                  |
| ☽ — 5.     | Noon.              | 45 27               |                        |                           | 38 32 $\frac{1}{2}$ | 146 10                 | 60      | G.     | Ditto.                  |
| ☽ — 6.     | Noon.              | 45 52               |                        |                           | 37 52 $\frac{2}{3}$ | 146 42                 | 56      | G.     | Ditto.                  |
| I 36 17    |                    | 38 53               | 48 26 $\frac{2}{3}$ U. | 76 32 20                  | 37 50 $\frac{1}{4}$ | 148 16                 | 61      | G.     | Ditto.                  |
| I 43 25    |                    | 37 56 $\frac{1}{2}$ | 49 47 $\frac{2}{3}$ U. | 76 35 0                   | 37 43               |                        | *       | G.     | ☽ & ☉. } Observed on    |
| I 49 12    |                    | 37 11 $\frac{1}{2}$ | 50 54 $\frac{1}{2}$ U. | 76 36 15                  | 37 43               | 148 48 $\frac{1}{2}$   |         | G.     | ☽ & ☉. } the Quarter.   |
| ☽ — 7.     | Noon.              |                     |                        |                           | 37 43               |                        |         | G.     | ☽ & ☉. } Deck.          |
| ☽ — 8.     | Noon.              |                     |                        |                           | 37 52               | 148 40                 | 65      | G.     | Latitude observed.      |
| ☽ — 9.     | Noon.              |                     |                        |                           | 36 36               | 148 36                 | 68      | G.     | Ditto.                  |
| ☉ — 10.    | Noon.              |                     |                        |                           | 36 19               | 150 10                 |         | G.     | Ditto.                  |
| 4 26 20    |                    | 16 2 $\frac{1}{3}$  | 38 39 $\frac{1}{2}$ U. | 121 45 30                 | 35 19               | 151 46                 |         | G.     | Ditto.                  |
| ☽ — 11.    | Noon.              | 51 21               |                        |                           | 35 1 $\frac{1}{2}$  | 152 54                 | *       | G.     | ☽ & ☉. Obs. on the Q.D. |
| ☽ — 12.    | Noon.              | 52 47               |                        |                           | 34 15               | 153 01                 | 60      | G.     | Quarter Deck.           |
| ☽ — 13.    | Noon.              | 54 19               |                        |                           | 33 12               | 153 47                 | 62      | G.     | Ditto.                  |
| ☽ — 14.    | Noon.              | 54 40               |                        |                           | 32 3                | 154 24                 | 60      | G.     | Ditto.                  |
| ☽ — 15.    | Noon.              |                     |                        |                           | 32 5                | 155 05                 | 62      | G.     | Ditto.                  |
| ☽ — 16.    | Noon.              | 55 47               |                        |                           | 32 36               | 157 48                 | 64      | G.     | Latitude by account.    |
| ☉ — 17.    | Noon.              | 57 41               |                        |                           | 31 44 $\frac{2}{3}$ | 159 34                 | 60      | G.     | Main Deck.              |
| ☽ — 18.    | Noon.              | 59 19               |                        |                           | 30 14               | 160 24                 | 60      | G.     | Ditto.                  |
| ☽ — 19.    | Noon.              |                     |                        |                           | 28 59 $\frac{1}{2}$ | 160 50                 | 62      | G.     | Quarter Deck.           |
| ☽ — 20.    | Noon.              | 59 44               |                        |                           | 29 0                | 160 43                 | 62      | G.     | Latitude by account.    |
| ☽ — 21.    | Noon.              | 59 32               |                        |                           | 29 21 $\frac{1}{4}$ | 161 5                  | 52      | G.     | Poop.                   |
| ☽ — 22.    | Noon.              | 58 45               |                        |                           | 29 56 $\frac{2}{3}$ | 162 0                  | 64      | G.     | Ditto.                  |
| 21 7 10    |                    | 36 48 $\frac{2}{3}$ | 30 12 $\frac{1}{2}$ U. | 75 57 20                  | 31 7 $\frac{1}{6}$  | 163 0                  | 62      | G.     | Ditto.                  |
| 21 16 13   |                    | 38 32 $\frac{1}{2}$ | 29 07 U.               | 75 54 10                  | 31 51 $\frac{1}{2}$ |                        | *       | G.     | ☽ & ☉. } Very dif-      |
| 21 22 32   |                    | 39 42               | 28 21 U.               | 75 52 45                  | 31 51 $\frac{1}{2}$ | 162 54                 |         | G.     | ☽ & ☉. } rinct.         |
| ☽ — 23.    | Noon.              | 58 16               |                        |                           | 31 51 $\frac{1}{2}$ |                        |         | G.     | (2) ☽ & ☉. } Poop.      |
| ☉ — 24.    | Noon.              |                     |                        |                           | 31 59 $\frac{2}{3}$ | 164 16                 | 60      | G.     | Quarter Deck.           |
| ☽ — 25.    | Noon.              | 56 30               |                        |                           | 33 18               | 164 43                 | 66      | G.     | Latitude by account.    |
|            |                    |                     |                        |                           | 34 32 $\frac{3}{4}$ | 167 2                  | 64      | G.     | Quarter Deck.           |

## ASTRONOMICAL OBSERVATIONS.

| 1769.  | Time by the Watch. | Alt. ☉'s L.L. or * | Moon's Altitude. | Dist. ☉'s L. from ☉ or * | Ship's Latit. S. | Long. W. of Greenwich. | Thermo. | Obsev. | PHENOMENA AND REMARKS.  |
|--|--------------------|--------------------|------------------|--------------------------|------------------|------------------------|---------|--------|---|
|  | H / "              | ° / '              | ° / '            | ° / '                    | ° / '            | ° / '                  |         |        |   |
| ♂ Sept. 26.                                    | Noon.              |                    |                  |                          | 36 9             | 169 16                 | 64      | .      | Latitude by account.  |
| ♂ — 27.  | Noon.              | 54 16              |                  |                          | 37 34            | 170 22                 | 62      | .      | Quar. Deck.   |
| ♂ — 28.  | Noon.              | 53 16              |                  |                          | 38 57½           | 171 27                 | 59      | G.     | Poop.   |
| ♀ — 29.  | Noon.              | 54 6               |                  |                          | 38 29½           | 172 46                 | 62      | G.     | Main Deck.  |
| ♂ — 30.  | Noon.              | 54 35              |                  |                          | 38 25½           | 175 2                  | 62      | G.     | Quar. Deck.   |
| ♂ Oct. 1.                                      | Noon               |                    |                  |                          | 37 45            | 175 45                 | 64      | G.     | Latitude observed. The observed latitude several miles to the northward of that by account. |
| ♂ — 2.   | Noon.              | 56 37              |                  |                          | 37 10            | 176 30                 | 63      | G.     | Ship N. of the account.   |
| ♂ — 3.   | Noon.              | 57 16              |                  |                          | 36 54½           | 177 30                 | 62      | G.     | Ship 10' N. of the account.   |
|  | 3 57 50            | 28 28              | 71 36½ L.        | 47 16 0                  | 36 58½           | 178 46½                | *       | G.     | ☉ and ☉. Indifferent.   |
|  | 4 23 32½           | 23 27              | 68 15 L.         | 47 22 30                 | 36 58½           | 178 37                 | *       | G.     | ☉ and ☉. (2)  |
|  | 5 22 17            | 12 11½             | 58 32 L.         | 47 36 27                 | 36 59½           | 178 21½                | *       | G.     | ☉ & ☉. } Very good.   |
|  | 5 29 23            | 10 48              | 57 14½ L.        | 47 38 30                 | 36 59½           | 178 37                 | *       | G.     | ☉ & ☉. } Quar. Deck.  |
| ♂ — 4.   | Noon.              | 56 50              |                  |                          | 37 43½           | 179 13                 | 62      | G.     | Merid. Altit. ☉'s L.L.  |
| ♂ — 5.   | Noon.              | 56 32              |                  |                          | 38 24¾           | 180 24                 | 62      | G.     | Do tro.   |
|  | 1 17 5             | 53 4½              | 43 15½ L.        | 68 28 0                  |                  | 179 48¾                | *       | G.     | ☉ & ☉. }  |
|  | 1 17 5             | 53 4½              | 43 15½ L.        | 68 29 10                 |                  | 180 27¼                | *       | M      | ☉ & ☉. }  |
|  | 1 24 17            | 52 21½             | 44 37½ L.        | 68 31 20                 |                  | 180 18¼                | *       | G.     | ☉ & ☉. } Very good; but too near noon. Observed on the Poop.                                |
|  | 1 24 17            | 52 21½             | 44 37½ L.        | 68 29 40                 | 38 26¾           | 179 22¼                | *       | M      | ☉ & ☉. }  |
|  | 1 30 42            | 51 41              | 45 51½ L.        | 68 33 20                 |                  | 180 13¼                | *       | G.     | ☉ & ☉. }  |
|  | 1 30 42            | 51 41              | 45 51½ L.        | 68 33 0                  |                  | 180 2                  | *       | M      | ☉ & ☉. }  |
|  | 1 56 6             | 51 1               | 46 52½ L.        | 68 35 27                 |                  | 180 17½                | *       | G.     | ☉ & ☉. }  |
|  | 1 36 6             | 51 1               | 46 52½ L.        | 68 34 43                 |                  | 179 52½                | *       | M      | ☉ & ☉. }  |
|  | 3 30 5             | 33 31½             | 66 58½ L.        | 69 8 10                  |                  | 179 36½                | *       | G.     | ☉ & ☉. }  |
|  | 3 30 5             | 33 31½             | 66 58½ L.        | 69 9 30                  | 38 31            | 180 21                 | *       | M      | ☉ & ☉. }  |
|  | 3 37 33            | 32 7½              | 68 10½ L.        | 69 10 40                 |                  | 179 48½                | *       | G.     | ☉ & ☉. } Observed on the Poop.  |
|  | 3 37 33            | 32 7½              | 68 10½ L.        | 69 12 30                 |                  | 180 49½                | *       | M      | ☉ & ☉. } Very good.   |
|  | 3 44 40            | 30 50              | 69 10 L.         | 69 12 27                 |                  | 179 46                 | *       | G.     | ☉ & ☉. }  |
|  | 3 44 40            | 30 50              | 69 10 L.         | 69 13 55                 | 38 31¼           | 180 35                 | *       | M      | ☉ & ☉. }  |
|  | 3 50 50            | 29 41              | 69 56½ L.        | 69 13 5                  |                  | 179 7                  | *       | G.     | ☉ & ☉. }  |
|  | 3 50 50            | 29 41              | 69 56½ L.        | 69 16 0                  |                  | 180 44½                | *       | M      | ☉ & ☉. }  |
| ♀ — 6.   | Noon.              | 56 9               |                  |                          | 39 11            | 180 49¼                | 64      |        |   |
| At 2 0 0 New Zealand was seen bearing W. by N. |                    |                    |                  |                          |                  |                        |         |        |   |
|  | 4 9 48             | 26 52½             | 63 59½ U.        | 80 19 30                 |                  | 181 10                 | *       | G.     | ☉ & ☉. } Observed on the Poop.  |
|  | 4 16 31            | 25 34½             | 64 57½ U.        | 80 21 50                 | 39 11            | 181 22¼                | *       | G.     | ☉ & ☉. } Very good.   |
|  | 4 21 51            | 24 34½             | 65 47½ U.        | 80 24 0                  |                  | 181 47                 | *       | G.     | ☉ & ☉. }  |
| ♂ — 7.   | Noon.              | 56 45              |                  |                          | 38 58            | 181 27                 | 62      |        |   |
|  | 3 56 22            | 29 53              | 52 3½ L.         | 91 22 17                 |                  | 182 41¼                | *       | G.     | ☉ & ☉. }  |
|  | 4 3 39             | 28 31½             | 53 20½ L.        | 91 24 20                 | 38 55½           | 182 36                 | *       | G.     | ☉ & ☉. } Observed on the Q. Deck.   |
|  | 4 8 40             | 27 35              | 54 15 L.         | 91 26 0                  |                  | 182 43¾                | *       | G.     | ☉ & ☉. }  |
| ♂ — 8.   | Noon.              |                    |                  |                          |                  |                        | 61      |        |   |
| ♂ — 9.   | Noon.              |                    |                  |                          | 38 42            | 181 35½                |         |        |   |
| ♂ — 10.  | Noon.              |                    |                  |                          |                  |                        |         |        | In Poverty Bay, New Zealand.  |



| 1769.      | Time by the Watch. | Alt. ☉'s<br>L. or * | Moon's<br>Altitude.    | Dist. ☉'s L.<br>from ☉ or * | Ship's<br>Latit. S. | Long. W. of<br>Greenwich. | Thermo. | Obsev. | PHENOMENA<br>AND<br>REMARKS. |
|------------|--------------------|---------------------|------------------------|-----------------------------|---------------------|---------------------------|---------|--------|------------------------------|
| H          | "                  | "                   | "                      | "                           | "                   | "                         | "       | "      | "                            |
| 8 Octo 11. | Noon.              | 57 57               |                        |                             | 39 15               | 182 1                     | 64      |        |                              |
| 24 — 12.   | Noon.              | 58 15               |                        |                             | 39 21 $\frac{2}{3}$ | 182 5                     | 66      |        |                              |
| 2 — 13.    | Noon.              | 58 54               |                        |                             | 39 5                | 182 31                    | 64      |        |                              |
| 5 — 14.    | Noon.              |                     |                        |                             | 39 37               | 182 59 $\frac{1}{3}$      | 65      |        |                              |
| 10 — 15.   | Noon.              | 58 55               |                        |                             | 39 48 $\frac{2}{3}$ | 182 46                    | 66      |        |                              |
| 11 — 16.   | Noon.              | 58 33               |                        |                             | 40 32 $\frac{1}{2}$ | 183 13                    | 64      |        |                              |
| 13 — 17.   | Noon.              | 59 36               |                        |                             | 39 51 $\frac{1}{2}$ | 182 27 $\frac{1}{2}$      | 64      |        | Quarter Deck.                |
| 14 — 18.   | Noon.              | 60 15               |                        |                             | 39 34 $\frac{1}{4}$ | 182 27                    | 66      |        |                              |
| 24 — 19.   | Noon.              | 61 26               |                        |                             | 38 45               | 181 42                    | 66      |        |                              |
| 2 — 20.    | Noon.              |                     |                        |                             | 38 16               | 181 25 $\frac{1}{2}$      | 64      |        | In Tegadoo Bay, New Zealand. |
| 5 — 21.    | Noon.              |                     |                        |                             |                     |                           | 61      |        |                              |
| 10 — 22.   | Noon.              | 63 1                |                        |                             | 38 13 $\frac{3}{4}$ | 181 20 $\frac{1}{2}$      | 62      |        |                              |
|            | 20 19 0            | 31 0 $\frac{2}{3}$  | 41 53 U.               | 67 24 50                    |                     | 180 16                    | *       | G.     | ☉ & ☉. Right before          |
|            | 20 24 40           | 32 14               | 41 46 $\frac{1}{3}$ U. | 67 22 52                    |                     | 180 12                    | *       | G.     | ☉ & ☉. Tegadoo Bay,          |
|            | 20 30 8            | 33 13 $\frac{1}{3}$ | 41 37 U.               | 67 21 0                     | 38 16               | 180 14 $\frac{3}{4}$      | *       | G.     | ☉ & ☉. and about 3           |
|            | 20 35 9            | 34 12 $\frac{1}{3}$ | 41 25 $\frac{1}{3}$ U. | 67 19 10                    |                     | 180 20 $\frac{1}{2}$      | *       | G.     | ☉ & ☉. miles from it.        |
|            | 20 39 52           | 35 4 $\frac{1}{3}$  | 41 15 U.               | 67 17 20                    |                     | 180 31 $\frac{1}{2}$      | *       | G.     | ☉ & ☉. Good. Poop.           |
| 11 — 23.   | Noon.              | 63 15 $\frac{1}{2}$ |                        |                             | 38 20 $\frac{2}{3}$ | 181 19                    | 66      |        | Off the N.P. of Tolaga B.    |
|            | 19 12 21           | 19 30 $\frac{1}{3}$ | 42 7 $\frac{1}{3}$ U.  | 55 21 30                    |                     | 181 0 $\frac{1}{4}$       | *       | G.     | ☉ & ☉.                       |
|            | 19 17 37           | 20 27 $\frac{1}{3}$ | 42 38 $\frac{1}{3}$ U. | 55 19 10                    | 38 22               | 181 26                    | *       | G.     | ☉ & ☉.                       |
|            | 19 22 56           | 21 35 $\frac{1}{3}$ | 43 8 $\frac{1}{3}$ U.  | 55 17 25                    |                     | 181 18                    | *       | G.     | ☉ & ☉.                       |
|            | 19 28 0            | 22 37               | 43 32 $\frac{2}{3}$ U. | 55 16 0                     |                     | 181 11                    | *       | G.     | ☉ & ☉. In Tolaga Bay,        |
| 13 — 24.   | Noon.              |                     |                        |                             | 38 22 $\frac{1}{3}$ | 181 27                    |         |        | New Zealand.                 |
| 14 — 25.   | Noon.              |                     |                        |                             |                     |                           |         |        | Observed on                  |
| 24 — 26.   | Noon.              |                     |                        |                             |                     |                           | 68      |        | the Poop.                    |
| 2 — 27.    | Noon.              |                     |                        |                             |                     |                           |         |        |                              |
| 5 — 28.    | Noon.              |                     |                        |                             |                     |                           | 68      |        |                              |
| 10 — 29.   | Noon.              | 65 13               |                        |                             | 38 25               | 181 14 $\frac{1}{2}$      | 68      |        | Quarter Deck.                |
| 11 — 30.   | Noon.              | 66 9                |                        |                             | 37 48 $\frac{1}{4}$ | 181 6                     | 66      |        | Q. D. Dist. off Shore 6m.    |
| 13 — 31.   | Noon.              | 66 47               |                        |                             | 37 29 $\frac{2}{3}$ | 181 56 $\frac{1}{2}$      | 64      |        | Quarter Deck.                |
| 8 Nov. 1.  | Noon.              | 66 45               |                        |                             | 37 51               | 182 24                    | 64      |        | Ditto.                       |
|            | 3 47 19            | 35 33 $\frac{1}{3}$ | 69 36 L.               | 38 30 45                    |                     | 183 31 $\frac{1}{4}$      | *       | G.     | ☉ & ☉. Mount Edge-           |
|            | 3 58 44            | 33 20 $\frac{2}{3}$ | 67 59 $\frac{1}{3}$ L. | 38 34 35                    | 37 55 $\frac{2}{3}$ | 183 57 $\frac{1}{2}$      | *       | G.     | ☉ & ☉. cumbe W. &            |
|            | 4 10 32            | 31 2                | 66 6 $\frac{1}{3}$ L.  | 38 36 57                    |                     | 183 31 $\frac{1}{2}$      | *       | G.     | ☉ & ☉. White Island          |
|            | 4 17 17            | 29 43 $\frac{1}{3}$ | 64 59 $\frac{1}{3}$ L. | 38 38 40                    |                     | 183 26                    | *       | G.     | ☉ & ☉. No 4. W. B. C.        |
| 24 — 2.    | Noon.              | 67 15 $\frac{1}{2}$ |                        |                             | 37 39 $\frac{1}{4}$ | 183 21                    | 66      |        | Quart. Deck.                 |
| 2 — 3.     | Noon.              | 68 17 $\frac{1}{2}$ |                        |                             | 36 55 $\frac{3}{4}$ | 183 48                    | 68      |        | Quarter Deck.                |
|            | 2 49 50            | 44 55 $\frac{2}{3}$ | 66 57 $\frac{2}{3}$ U. | 60 15 45                    |                     | 184 51 $\frac{1}{2}$      | *       | G.     | ☉ & ☉. Off the en-           |
|            | 3 0 9              | 42 57 $\frac{2}{3}$ | 68 19 $\frac{1}{3}$ U. | 60 17 0                     |                     | 184 2 $\frac{1}{2}$       | *       | G.     | ☉ & ☉. trance into           |
|            | 3 5 35             | 41 51 $\frac{2}{3}$ | 69 5 $\frac{1}{3}$ U.  | 60 18 45                    |                     | 184 4                     | *       | G.     | ☉ & ☉. Mercury Bay,          |
|            | 3 10 30            | 40 53 $\frac{2}{3}$ | 69 41 U.               | 60 20 25                    | 36 51 $\frac{1}{3}$ | 184 17 $\frac{1}{2}$      | *       | G.     | ☉ & ☉. New Zealand.          |
|            | 3 15 23            | 39 59               | 70 18 $\frac{1}{3}$ U. | 60 22 20                    |                     | 184 39 $\frac{3}{4}$      | *       | G.     | ☉ & ☉. Forecastle.           |
| 5 — 4.     | Noon.              |                     |                        |                             |                     |                           | 70      |        |                              |
| 10 — 5.    | Noon.              |                     |                        |                             |                     |                           | 70      |        |                              |
| 11 — 6.    | Noon.              |                     |                        |                             |                     | 183 56 $\frac{1}{2}$      | 68      |        | In Mercury Bay.              |
| 13 — 7.    | Noon.              |                     |                        |                             |                     |                           | 74      |        |                              |

## ASTRONOMICAL OBSERVATIONS.

| 1769.     | Time by the Watch.   | Alt. ☉'s L.L. or *  | Moon's Altitude.    | Dist. ☽'s L. from ☉ or *. | Ship's Latit. S.    | Long. W. of Greenwich. | Thermo. | Obsev. | PHENOMENA AND REMARKS.   |
|-----------|--|---------------------|---------------------|---------------------------|---------------------|------------------------|---------|--------|--|
| 8 Nov. 8. | Noon.  |                     |                     |                           | 36 47 $\frac{3}{4}$ |                        | 75      |        | Observed by Capt. Cook with the Astro. Quad.                     |
|           | At 19 <sup>h</sup> 20' 58" apparent Time, the transit of Mercury began. Observed by Mr. Green, alone; Capt. Cook being then taking altitudes of the Sun for ascertaining the time. |                     |                     |                           |                     |                        |         |        |  |
| 24 — 9.   | Noon.  |                     |                     |                           | 36 48 $\frac{1}{2}$ |                        |         |        | Observed with the Astronomical Quadrant.                         |
|           | At 8 <sup>h</sup> 8' 45"   |                     |                     |                           |                     |                        |         |        | } Captain Cook.<br>Mr. Green.<br>Captain Cook.<br>Mr. Green. } † |
|           | At 8 <sup>h</sup> 8' 58"   |                     |                     |                           |                     |                        |         |        |  |
|           | At 9 <sup>h</sup> 9' 43"   |                     |                     |                           |                     |                        |         |        |  |
|           | At 9 <sup>h</sup> 9' 55"   |                     |                     |                           |                     |                        |         |        |  |
| 2 — 10.   | Noon.  |                     |                     |                           |                     |                        | 72      |        |  |
| 2 — 11.   | Noon.  |                     |                     |                           |                     |                        | 70      |        |  |
| ☉ — 12.   | Noon.  |                     |                     |                           |                     | 183 56 $\frac{1}{2}$   |         |        | In Mercury Bay.  |
| ☽ — 13.   | Noon.  |                     |                     |                           |                     |                        | 66      |        |  |
| ♂ — 14.   | Noon.  |                     |                     |                           |                     |                        | 67      |        |  |
| ♀ — 15.   | Noon.  | 71 50               |                     |                           | 36 45 $\frac{1}{4}$ | 183 48                 | 68      |        | ☉'s Meridian Altitude.   |
| 24 — 16.  | Noon.  |                     |                     |                           | 36 31 $\frac{1}{2}$ | 183 40                 | 68      |        | Latitude observed.   |
| ♀ — 17.   | Noon.  |                     |                     |                           |                     |                        | 64      |        |  |
|           | 19 18 38   | 23 18 $\frac{2}{3}$ | 29 31               | U. III 23 0               |                     | 182 53 $\frac{1}{2}$   | *       | G.     | ☽ & ☉.   |
|           | 19 18 38   | 23 18 $\frac{2}{3}$ | 29 31               | U. III 22 0               |                     | 183 21 $\frac{1}{2}$   | *       | C.     | ☽ & ☉.   |
|           | 19 29 32   | 25 25               | 28 15 $\frac{1}{3}$ | U. III 18 15              |                     | 183 11                 | *       | G.     | ☽ & ☉.   |
|           | 19 29 32   | 25 25               | 28 15 $\frac{1}{3}$ | U. III 17 5               | 36 28 $\frac{2}{3}$ | 183 43                 | *       | C.     | ☽ & ☉.   |
|           | 19 38 19   | 27 12 $\frac{1}{4}$ | 27 9 $\frac{2}{3}$  | U. III 14 55              |                     | 183 5 $\frac{1}{2}$    | *       | G.     | ☽ & ☉.   |
|           | 19 38 19   | 27 12 $\frac{1}{4}$ | 27 9 $\frac{2}{3}$  | U. III 13 30              |                     | 183 44 $\frac{1}{2}$   | *       | C.     | ☽ & ☉.   |
|           | 19 46 57   | 28 55 $\frac{2}{3}$ | 26 1 $\frac{2}{3}$  | U. III 12 0               |                     | 182 50 $\frac{1}{4}$   | *       | G.     | ☽ & ☉.   |
| 2 — 18.   | Noon.  | 72 50 $\frac{1}{2}$ |                     |                           | 36 28 $\frac{2}{3}$ | 184 16                 | 64      |        |  |

† These Times are taken from Captain Cook's Journal: Mr. Green's barely informs us that they went on shore to observe the Transit of Mercury; and I cannot meet with any thing farther concerning it in any of his books or papers which have come to my hands. But it is remarkable, that all the memorandum books, in which his observations were originally written down at the time when they were taken, are existing, except that which was current at this time; and which appears to have contained all his observations between the 3d of November 1769, and the 20th of February 1770. The loss of this book is more to be regretted, as it probably contained the altitudes of the sun, which these times were deduced from, as well as the times themselves; which are not now to be found. I think it also probable this book might have furnished us with some corrections of the lunar observations, on account of the errors of the quadrants, which may have been omitted in transcribing the observations into the fair books; as I have met with instances of such omissions in other places: and Mr. Green's longitude of Queen Charlotte's Sound differing so much from the longitude of that place, as determined by every other person, seems to add strength to such a supposition.

# ASTRONOMICAL OBSERVATIONS.

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| 1769.   | Time by the Watch.    | Alt. $\odot$ 's<br>L.L. or * | Moon's<br>Altitude.    | Diff. $\odot$ 's L.<br>from $\odot$ or *. | Ship's<br>Latit. S. | Long. W. of<br>Greenwich.                                  | Thermo. | Oberv. | PHENOMENA<br>AND<br>REMARKS.               |                                     |
|---|-----------------------|------------------------------|------------------------|---|---------------------|--|---------|--------|--|-------------------------------------|
|   | h' / "                | o' / "                       | o' / "                 | o' / "                                    | o' / "              | o' / "   |         |        |  |                                     |
| Nov. 19.  | Noon.                 | 72 33                        |                        |   |                     |  |         |        |  |                                     |
|   | 19 56.39              | 30 43 $\frac{1}{6}$          | 44 13 $\frac{2}{3}$ U. | 85 32 55                                  | 36 59 $\frac{2}{3}$ | 184 6 $\frac{1}{2}$  | 70      | G.     | Quarter Deck. { Taken at anchor            |                                     |
|   | 20 4 41               | 32 19                        | 43 33 U.               | 85 30 25                                  |                     | 183 37   | *       | G.     | D & O. } Very good in the                  |                                     |
|   | 20 10 52              | 33 27 $\frac{2}{3}$          | 42 58 $\frac{2}{3}$ U. | 85 28 35                                  | 37 0                | 183 32   | *       | G.     | D & O. } Q.D. River                        |                                     |
|   | 20 16 18              | 34 38 $\frac{1}{3}$          | 42 28 $\frac{2}{3}$ U. | 85 26 15                                  |                     | 183 29   | *       | G.     | D & O. } Thames.                           |                                     |
|   | Noon.                 | 72 46                        |                        |   |                     | 183 37 $\frac{1}{2}$                                       | *       | G.     | D & O. } New Zealand.                      |                                     |
| 20.   | Noon.                 | 69 52 $\frac{5}{6}$          | 36 29 $\frac{1}{3}$ U. | 60 12 45                                  |                     | 184 6 $\frac{1}{2}$  | 74      | G.     | Quarter Deck.                              |                                     |
| 21.   | Noon.                 | 70 38 $\frac{2}{3}$          | 35 33 $\frac{2}{3}$ U. | 60 9 55                                   | 37 0 $\frac{1}{6}$  | 183 14   | 72      | G.     | D & O. }                                   |                                     |
|   | 22 59 47              | 71 15 $\frac{1}{3}$          | 34 30 $\frac{1}{3}$ U. | 60 8 10                                   |                     | 183 41   | *       | G.     | D & O. } At anchor in                      |                                     |
|   | 23 5 15               | 71 44 $\frac{1}{3}$          | 33 31 $\frac{1}{3}$ U. | 60 6 40                                   | 36 59 $\frac{4}{5}$ | 183 20 $\frac{7}{8}$                                       | *       | G.     | D & O. } the River                         |                                     |
|   | 23 10 59              | 73 12                        |                        |   |                     | 183 23 $\frac{3}{8}$                                       | *       | G.     | D & O. } Thames. Obf.                      |                                     |
|   | 23 15 35              |                              |                        |   |                     |  |         |        | on the Q. D.                               |                                     |
| 22.   | Noon.                 |                              |                        |   | 36 59 $\frac{4}{5}$ | It was noon, according to equal altitudes,                 |         |        |  |                                     |
| at 23 52 34: the watch was therefore too slow for apparent Time by 7' 26". Thermometer 74°. |                       |                              |                        |   |                     |  |         |        |  |                                     |
| 23.   | Noon.                 | 73 34                        |                        |   | 36 51 $\frac{3}{4}$ | 184 10   | 76      | G.     | Quarter Deck. Two miles from the shore.    |                                     |
|   | 0 30 17               | 71 56                        | 31.34 U.               | 48 3 15                                   | 36 51 $\frac{3}{4}$ | 183 52   | *       | G.     | D & O. At anchor in the River Thames. Q.D. |                                     |
| 24.   | Noon.                 | 74 19                        |                        |   | 36 16 $\frac{3}{4}$ |  | 62      | G.     | Main Deck.                                 |                                     |
| 25.   | Noon.                 | 75 12                        |                        |   | 35 35 $\frac{3}{4}$ |  | 60      | G.     | Forecastle.                                |                                     |
| 26.   | Noon.                 | 75 48 $\frac{1}{2}$          |                        |   | 35 10               |  | 60      | G.     | Main Deck.                                 |                                     |
| 27.   | Noon.                 | 76 15                        |                        |   | 34 54 $\frac{1}{8}$ | 185 22   | 68      | G.     | Ditto.                                     |                                     |
| 28.   | Noon.                 | 76 20                        |                        |   | 34 59 $\frac{1}{2}$ | 185 12   | 68      | G.     | Forecastle.                                |                                     |
| 29.   | Noon.                 |                              |                        |   |                     | 185 16   |         |        |  |                                     |
| 30.   | Noon.                 | 76 26                        |                        |   | 35 13               | 185 16   | 70      | G.     | Forecastle.                                |                                     |
| Dec. 1.   | Noon.                 | 76 34                        |                        |   | 35 14               | 185 16   | 72      | G.     | Ditto.                                     |                                     |
|   | 4 5 1                 | 38 51 $\frac{5}{6}$          | 69 39 $\frac{1}{3}$ C. | 40 46 48                                  |                     | 186 13 $\frac{3}{4}$                                       | *       | G.     | D & O. } Quarter                           |                                     |
|   | 4 11 13               | 37 33 $\frac{2}{3}$          | 68 42 $\frac{2}{3}$ C. | 40 47 35                                  |                     | 185 41   | *       | G.     | D & O. } Deck.                             |                                     |
|   | 4 17 46               | 36 17 $\frac{1}{2}$          | 67 51 C.               | 40 49 55                                  |                     | 186 1  | *       | G.     | D & O. }                                   |                                     |
| 2.  | Noon.                 |                              |                        |   |                     |  | 63      |        |  |                                     |
| 3.  | Noon.                 | 76 51                        |                        |   | 35 14               | Height of the eye 19f. and 1 $\frac{1}{2}$ mile off shore. |         | 67     | G.   | On shore, a mile North of the ship. |
|   | 2 27 28               | 54 23 $\frac{1}{2}$          | 56 2 $\frac{2}{3}$ U.  | 62 44 50                                  |                     | 186 00   | *       | G.     | D & O. }                                   |                                     |
|   | 2 38 34               | 52 16                        | 57 44 $\frac{1}{2}$ U. | 62 48 52                                  |                     | 186 29 $\frac{1}{2}$                                       | *       | G.     | D & O. (2) } Dip. for the                  |                                     |
|   | 2 44 43 $\frac{1}{2}$ | 51 0                         | 58 45 $\frac{1}{2}$ U. | 62 50 15                                  |                     | 186 15 $\frac{1}{8}$                                       | *       | G.     | D & O. (2) } alt. 5';                      |                                     |
|   | 2 51 25               | 49 39                        | 59 51 $\frac{2}{3}$ U. | 62 51 55                                  |                     | 186 11   | *       | G.     | D & O. } for the                           |                                     |
|   | 2 57 46 $\frac{1}{2}$ | 48 22 $\frac{1}{2}$          | 60 43 $\frac{1}{2}$ U. | 62 54 0                                   |                     | 186 15 $\frac{1}{8}$                                       | *       | G.     | D & O. (2) } $\odot$ 's 4'.                |                                     |
| 4.  | Noon.                 | 76 59                        |                        |   | 35 14               |  | 68      | G.     | Quarter Deck.                              |                                     |
|   | 3 34 42               | 40 44 $\frac{1}{2}$          | 56 18 $\frac{2}{3}$ U. | 74 28 28                                  |                     | 184 42 $\frac{3}{4}$                                       | *       | G.     | D & O. }                                   |                                     |
|   | 3 41 13               | 39 25                        | 57 12 $\frac{2}{3}$ U. | 74 30 48                                  |                     | 184 55   | *       | G.     | D & O. } Dip. for the                      |                                     |
|   | 3 46 47               | 38 16                        | 57 48 $\frac{2}{3}$ U. | 74 33 53                                  |                     | 185 38 $\frac{7}{8}$                                       | *       | G.     | D & O. } $\odot$ 's alt. 4';               |                                     |
|   | 3 52 57               | 37 0 $\frac{1}{2}$           | 58 25 $\frac{1}{2}$ U. | 74 34 48                                  |                     | 185 11 $\frac{1}{4}$                                       | *       | G.     | D & O. } for the $\odot$ 's                |                                     |
|   | 3 59 3                | 35 45 $\frac{1}{2}$          | 59 3 U.                | 74 36 23                                  |                     | 185 1 $\frac{1}{2}$  | *       | G.     | D & O. } 12'.                              |                                     |
| 5.  | Noon.                 | 77 11 $\frac{1}{2}$          |                        |   | 35 8 $\frac{3}{4}$  | 185 16   | 68      | G.     | Quarter Deck.                              |                                     |

At anchor in the Bay of Islands.

At anchor in the Bay of Islands.

## ASTRONOMICAL OBSERVATIONS.

| 1769.     | Time by the         | Alt. $\odot$ 's        | Moon's                 | Dift. $\odot$ 's L. | Ship's               | Long. W. of          | Thermo. | Oberv. | PHENOMINA<br>AND<br>REMARKS.  |                       |
|-----------|---------------------|------------------------|------------------------|---------------------|----------------------|----------------------|---------|--------|---|-----------------------|
|           | Watch.              | L.L.or*                | Altitude.              | from $\odot$ or *   | Latit. S.            | Greenwich.           |         |        |   |                       |
| ♂ Dec. 5. | 3 20 05             | 46 47 $\frac{1}{3}$    | 41 0 $\frac{1}{3}$ U.  | 86 2 40             |                      | 185 25 $\frac{1}{4}$ | *       | G.     | D & $\odot$ . } Quarter Deck.<br>In the entrance<br>of the Bay of<br>Islands. |                       |
|           | 3 25 35             | 45 38 $\frac{1}{3}$    | 41 55 $\frac{2}{3}$ U. | 86 4 30             | 35 8                 | 185 21 $\frac{1}{4}$ | *       | G.     |   |                       |
|           | 3 30 18             | 44 35 $\frac{1}{3}$    | 42 46 $\frac{2}{3}$ U. | 86 6 10             |                      | 185 19               | *       | G.     |   |                       |
|           | 3 34 2              | 43 30                  | 43 34 $\frac{2}{3}$ U. | 86 7 40             |                      | 185 8 $\frac{3}{4}$  | *       | G.     | D & $\odot$ . } Forecastle.   |                       |
|           | Noon.               | 77 28 $\frac{1}{2}$    |                        |                     | 34 58 $\frac{1}{2}$  | 185 13               | 70      | G.     |   |                       |
|           | 3 12 50             | 45 22                  | 31 7 U.                | 98 8 27             |                      | 186 10               | *       | G.     |   |                       |
|           | 3 12 50             | 45 22                  | 31 7 U.                | 98 6 57             |                      | 185 25 $\frac{1}{4}$ | *       | C.     | D & $\odot$ . } Cape Brett<br>S.S.E. distance<br>about 6 leagues.<br>Poop.    |                       |
|           | 3 19 2              | 44 4 $\frac{1}{3}$     | 32 9 $\frac{2}{3}$ U.  | 98 11 30            | 34 53                | 186 27 $\frac{1}{4}$ | *       | G.     |   |                       |
|           | 3 19 2              | 44 4 $\frac{1}{3}$     | 32 9 $\frac{2}{3}$ U.  | 98 10 23            |                      | 185 54 $\frac{1}{2}$ | *       | C.     |   |                       |
|           | 3 27 14             | 42 24 $\frac{1}{3}$    | 33 32 $\frac{1}{3}$ U. | 98 14 45            |                      | 186 31               | *       | G.     | D & $\odot$ . } Latitude by account.  |                       |
| 3 27 14   | 42 24 $\frac{1}{3}$ | 33 32 $\frac{1}{3}$ U. | 98 13 40               | 35 1                | 185 58 $\frac{1}{2}$ | *                    | C.      |        |   |                       |
| Noon.     |                     |                        |                        |                     | 185 21 $\frac{1}{4}$ | 70                   | G.      |        |   |                       |
| — 6.      | 3 51 57             | 38 52 $\frac{1}{3}$    | 24 48 U.               | 110 46 50           |                      | 186 0 $\frac{3}{4}$  | *       | G.     | D & $\odot$ . } Off the Ca-<br>valle Isles.<br>Poop.                          |                       |
|           | 3 57 7              | 37 50                  | 25 38 $\frac{5}{6}$ U. | 110 48 55           |                      | 185 59               | *       | G.     |   |                       |
|           | 4 2 3               | 36 48 $\frac{1}{3}$    | 26 27 $\frac{5}{6}$ U. | 110 51 40           | 34 59 ::             | 186 15 $\frac{1}{2}$ | *       | G.     |   |                       |
|           | 4 6 41              | 35 53 $\frac{1}{3}$    | 27 12 $\frac{5}{6}$ U. | 110 54 0            |                      | 186 28 $\frac{1}{2}$ | *       | G.     | D & $\odot$ . } Observed on the Poop.   |                       |
|           | 4 10 54             | 35 1 $\frac{2}{3}$     | 27 56 $\frac{1}{6}$ U. | 110 55 50           |                      | 186 32 $\frac{1}{2}$ | *       | G.     |   |                       |
|           | Noon.               | 77 58 $\frac{1}{2}$    |                        |                     | 34 41 $\frac{1}{2}$  | 185 35               | 70      | G.     |   |                       |
|           | 4 34 23             | 31 34                  | 19 2 U.                | 123 56 0            |                      | 186 10               | *       | G.     | D & $\odot$ . } Off Doubtless<br>Bay. Poop.                                   |                       |
|           | 4 40 50             | 30 14 $\frac{2}{3}$    | 20 5 $\frac{2}{3}$ U.  | 123 59 25           |                      | 186 22               | *       | G.     |   |                       |
|           | 4 45 34             | 29 20 $\frac{1}{3}$    | 20 52 $\frac{1}{3}$ U. | 124 2 5             | 34 48 $\frac{1}{2}$  | 186 38 $\frac{1}{2}$ | *       | G.     |   |                       |
|           | 4 50 11             | 28 23                  | 21 37 $\frac{2}{3}$ U. | 124 4 55            |                      | 186 59               | *       | G.     | D & $\odot$ . } Forecastle.   |                       |
| 4 54 32   | 27 27 $\frac{1}{3}$ | 22 19 $\frac{2}{3}$ U. | 124 6 15               |                     | 186 40 $\frac{1}{2}$ | *                    | G.      |        |   |                       |
| Noon.     | 78 1                |                        |                        | 34 44 $\frac{1}{6}$ | 185 57               | 70                   | G.      |        |   |                       |
| — 10.     | Noon.               | 78 11 $\frac{3}{4}$    |                        |                     | 34 38 $\frac{2}{3}$  | 186 24               | 70      | G.     | Quarter Deck.   |                       |
| — 11.     | Noon.               | 78 23 $\frac{1}{2}$    |                        |                     | 34 31 $\frac{1}{2}$  | 186 16               | 70      | G.     | Ditto.  |                       |
| — 12.     | Noon.               | 78 25                  |                        |                     | 34 34 $\frac{1}{4}$  | 186 20               | 72      | G.     | Ditto.  |                       |
| — 13.     | Noon.               |                        |                        |                     |                      |                      | 70      |        |   |                       |
| — 14.     | Noon.               | 78 58                  |                        |                     | 34 8 $\frac{1}{4}$   | 185 40               | 66      | G.     | Quarter Deck.   |                       |
| — 15.     | Noon.               | 78 59                  |                        |                     | 34 10                | 185 59               | 66      | G.     | Main Deck.  |                       |
| — 16.     | Noon.               | 79 29 $\frac{1}{2}$    |                        |                     | 33 42                | 186 27               | 70      | G.     | Quarter Deck.   |                       |
| — 17.     | 21 10 0             | 50 47                  | 9 44 U.                | 116 35 0            | 34 25 $\frac{2}{3}$  | 184 47 $\frac{1}{2}$ | *       | G.     | D & $\odot$ . (r) Clouds pre-<br>vented us from taking<br>more. Poop.         |                       |
|           | Noon.               | 78 53 $\frac{1}{2}$    |                        |                     | 34 19 $\frac{5}{6}$  | 186 38               | 68      | G.     |   | Quarter Deck.         |
|           | 19 36 33            | 34 28                  | 36 20 $\frac{1}{6}$ U. | 104 29 55           |                      | 185 31               | *       | G.     |   | D & $\odot$ . } Poop. |
|           | 19 42 22            | 35 44 $\frac{2}{3}$    | 35 19 $\frac{1}{3}$ U. | 104 27 30           |                      | 185 32               | *       | G.     |   |                       |
|           | 19 48 58            | 37 0 $\frac{1}{2}$     | 34 16 $\frac{5}{6}$ U. | 104 24 30           | 33 54 $\frac{3}{4}$  | 185 49 $\frac{1}{4}$ | *       | G.     |   |                       |
|           | 19 52 28            | 37 54 $\frac{2}{3}$    | 33 33 $\frac{1}{3}$ U. | 104 22 30           |                      | 185 58 $\frac{3}{4}$ | *       | G.     | D & $\odot$ . } Quarter Deck.   |                       |
|           | Noon.               | 79 6                   |                        |                     | 34 8 $\frac{3}{4}$   | 186 42               | 68      | G.     |   |                       |
|           | Noon.               | 79 14                  |                        |                     | 34 1 $\frac{1}{2}$   | 186 48               | 68      | G.     |   | Poop.                 |
|           | — 20.               | Noon.                  | 79 2                   |                     |                      | 34 14                | 186 49  | 70     | G.  | Main Deck.            |

# ASTRONOMICAL OBSERVATIONS.

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| 1769.      | Time by the Watch. |       | Alt. ☉'s<br>L.L. or * | Moon's<br>Altitude.    | Diff. ☉'s L.<br>from ☉ or *. | Ship's<br>Latit. S.  | Long. W. of<br>Greenwich. | Thermo. | Observ. | PHENOMENA<br>AND<br>REMARKS.  |
|------------|--------------------|-------|-----------------------|------------------------|------------------------------|----------------------|---------------------------|---------|---------|---|
|            | H                  | M     |                       |                        |                              |                      |                           |         |         |   |
| 8 Dec. 20. | 21                 | 21 48 | 54 5                  | 53 50 $\frac{2}{3}$ U. | 68 10 40                     |                      | 185 56 $\frac{1}{4}$      | *       | G.      | Very trouble-<br>some observ-<br>ing. Poop.<br>The North<br>Cape S. 21 $\frac{1}{2}$<br>E. true, dist.<br>67 miles.   |
|            | 21                 | 21 48 | 54 5                  | 53 50 $\frac{2}{3}$ U. | 68 10 20                     |                      | 186 7                     | *       | S.      |   |
|            | 21                 | 39 47 | 57 47 $\frac{2}{3}$   | 50 34 $\frac{2}{3}$ U. | 68 4 40                      |                      | 186 9 $\frac{1}{2}$       | *       | G.      |   |
|            | 21                 | 39 47 | 57 47 $\frac{2}{3}$   | 50 34 $\frac{2}{3}$ U. | 68 4 45                      | 33 20                | 186 7                     | *       | S.      |   |
|            | 21                 | 49 17 | 59 43                 | 48 38 $\frac{2}{3}$ U. | 68 0 50                      |                      | 186 38 $\frac{1}{2}$      | *       | G.      |   |
|            | 21                 | 49 17 | 59 43                 | 48 38 $\frac{2}{3}$ U. | 67 59 55                     |                      | 187 8                     | *       | S.      |   |
| 21 — Noon. |                    |       | 79 58                 |                        |                              | 33 17 $\frac{1}{8}$  | 187 18                    | 66      | G.      | Main Deck.  |
| 22 — Noon. |                    |       | 80 13                 |                        |                              | 33 2 $\frac{2}{5}$   |                           | 66      | G.      | Ditto.  |
|            | 21                 | 3 13  | 50 40 $\frac{1}{3}$   | 75 1 U.                | 45 43 0                      |                      | 186 56                    | *       | G.      | The North<br>Cape S. 36 $\frac{1}{2}$<br>E. true, dist.<br>28 leagues.<br>Poop.   |
|            | 21                 | 7 56  | 51 40 $\frac{1}{2}$   | 74 34 $\frac{1}{2}$ U. | 45 41 0                      |                      | 187 21                    | *       | G.      |   |
|            | 21                 | 7 56  | 51 40 $\frac{1}{2}$   | 74 34 $\frac{1}{2}$ U. | 45 40 30                     |                      | 187 36 $\frac{1}{2}$      | *       | S.      |   |
|            | 21                 | 17 22 | 53 38                 | 73 43 U.               | 45 38 50                     | 33 15                | 187 8 $\frac{1}{4}$       | *       | G.      |   |
|            | 21                 | 17 22 | 53 38                 | 73 43 U.               | 45 39 7                      |                      | 186 58 $\frac{3}{4}$      | *       | S.      |   |
|            | 21                 | 22 1  | 54 35 $\frac{1}{3}$   | 73 8 U.                | 45 37 30                     |                      | 187 12 $\frac{3}{4}$      | *       | G.      |   |
|            | 21                 | 22 1  | 54 35 $\frac{1}{3}$   | 73 8 U.                | 45 37 50                     |                      | 187 1 $\frac{1}{2}$       | *       | S.      |   |
| 23 — Noon. |                    |       | 79 59                 |                        |                              | 33 15 $\frac{3}{5}$  | 187 42 $\frac{1}{2}$      | 67      | G.      | Poop.   |
| 24 — Noon. |                    |       | 79 25                 |                        |                              | 33 49                | 187 45                    | 70      | G.      | Quarter Deck.   |
| 25 — Noon. |                    |       | 78 59                 |                        |                              | 34 12                | 188 5 $\frac{1}{2}$       | 66      | G.      | Poop. Three King's<br>Isles S. by E. 7 or 8 lcg.  |
| 26 — Noon. |                    |       | 78 0                  |                        |                              | 35 8 $\frac{4}{5}$   | 188 26                    | 68      | G.      | Quarter Deck.   |
| 27 — Noon. |                    |       |                       |                        |                              | 35 19                | 188 59                    | 67      | G.      | Latitude by account.  |
| 28 — Noon. |                    |       |                       |                        |                              | 34 50                | 188 30                    |         | G.      | Ditto.  |
| 29 — Noon. |                    |       | 78 12                 |                        |                              | 34 46 $\frac{2}{11}$ | 187 53                    | 67      | G.      | ☉'s Merid. Altitude.  |
| 30 — Noon. |                    |       | 78 0                  |                        |                              | 34 54 $\frac{3}{8}$  | 187 38                    | 67      | G.      | Ditto.  |
| 31 — Noon. |                    |       | 78 8                  |                        |                              | 34 41 $\frac{1}{4}$  | 187 28                    | 66      | G.      | Poop. ☉'s Merid. Altit.   |
| 1770.      |                    |       |                       |                        |                              |                      |                           |         |         |   |
| 1 Jan. 1.  |                    | Noon. | 78 8                  |                        |                              | 34 37                | 187 28                    | 68      | G.      | Ditto. ☉'s Merid. Altit.  |
|            | 2                  | 38 24 | 53 53 $\frac{2}{3}$   | 56 27 $\frac{1}{3}$ U. | 55 7 25                      | 34 34 $\frac{1}{2}$  | 188 25 $\frac{3}{4}$      | *       | G.      | Exceeding<br>clear & the obj.<br>very distinct.<br>Cape Maria<br>Van Diemen<br>N. 45° E. and<br>the middle of<br>Three King's<br>Isle N. 45° W.<br>by comp. Poop. |
|            | 2                  | 44 37 | 52 36 $\frac{1}{3}$   | 57 2 $\frac{1}{6}$ U.  | 55 9 30                      |                      | 188 32 $\frac{1}{4}$      | *       | G.      |   |
|            | 2                  | 50 28 | 51 28 $\frac{2}{3}$   | 57 27 $\frac{1}{3}$ U. | 55 12 0                      |                      | 188 57 $\frac{1}{2}$      | *       | G.      |   |
|            | 2                  | 56 6  | 50 18 $\frac{1}{3}$   | 57 52 U.               | 55 13 45                     |                      | 188 58                    | *       | G.      |   |
|            | 3                  | 2 18  | 49 01                 | 58 16 U.               | 55 15 35                     | 34 34                | 188 57                    | *       | G.      |   |
|            |                    |       |                       |                        |                              |                      |                           |         |         |   |
|            | 3                  | 41 0  |                       | 59 50 U.               |                              |                      |                           |         |         | ☉'s Merid. Altit. Poop.   |
| 2 — Noon.  |                    |       | 77 20                 |                        |                              | 35 19                | 187 25                    | 68      | G.      | ☉'s Merid. Altit. Ditto.  |
| 3 — Noon.  |                    |       | 76 31                 |                        |                              | 36 2                 | 187 16                    | 67      | G.      | Ditto. Quarter Deck.  |
|            | 4                  | 8 40  | 35 47 $\frac{1}{2}$   | 45 38 $\frac{1}{2}$ U. | 79 19 30                     |                      | 187 29                    | *       | G.      | Observed on<br>the Poop.  |
|            | 4                  | 13 57 | 34 45                 | 45 56 $\frac{1}{2}$ U. | 79 20 40                     |                      | 187 13 $\frac{3}{4}$      | *       | G.      |   |
|            | 4                  | 19 13 | 33 39                 | 46 17 U.               | 79 21 55                     | 36 51                | 187 27 $\frac{3}{4}$      | *       | G.      |   |
|            | 4                  | 24 33 | 32 34                 | 46 35 $\frac{1}{2}$ U. | 79 25 10                     |                      | 187 42                    | *       | G.      |   |
| 4 — Noon.  |                    |       | 75 56                 |                        |                              | 36 30 $\frac{1}{2}$  | 186 5                     | 64      | G.      | ☉'s Merid. Altit. M.D.  |
| 5 — Noon.  |                    |       | 77 9                  |                        |                              | 35 10 $\frac{1}{4}$  | 187 39                    | 66      | G.      | Ditto.  |
| 6 — Noon.  |                    |       |                       |                        |                              | 35 8                 | 187 39                    | 68      | G.      | Latitude observed.  |

## ASTRONOMICAL OBSERVATIONS.

| 1770.                 | Time by the Watch.           | Alt. $\odot$ 's<br>L.L. or *                      | Moon's<br>Altitude.  | Dist. $\odot$ 's L.<br>from $\odot$ or *. | Ship's<br>Latit. S. | Long. W. of<br>Greenwich. | Thermo.     | Obsev.         | PHENOMENA<br>AND<br>REMARKS.   |
|-----------------------|------------------------------|---|--|---|---------------------|---------------------------|-------------|----------------|--|
|                       | H ' "                        | ° ' "   | ° ' "  | ° ' "                                     | ° ' "               | ° ' "                     |             |                |  |
| $\frac{1}{2}$ Jan. 6. | 6 34 35<br>6 41 2<br>6 45 36 | 5 30 $\frac{1}{2}$<br>4 23<br>3 34 $\frac{1}{2}$  | 33 53 $\frac{1}{2}$ U.<br>34 14 $\frac{2}{3}$ U.<br>34 29 $\frac{1}{3}$ U. | 119 27 50<br>119 29 50<br>119 30 50       | 35 9 $\frac{1}{2}$  |                           | *<br>*<br>* | G.<br>G.<br>G. | <div> <math>\odot</math> &amp; <math>\odot</math>. { There appears<br/>to be an error<br/>in these observ.<br/>which cannot be<br/>accounted for. </div> |
| $\odot$ — 7.          | Noon.                        | 77 4  |  |   | 35 0                | 187 35                    | 70          | G.             | $\odot$ 's Merid. Altit. Q. D.   |
| $\odot$ — 8.          | Noon.                        | 76 11   |  |   | 35 44 $\frac{3}{4}$ | 186 44                    | 74          | G.             | Ditto.   |
| $\odot$ — 9.          | Noon.                        | 75 7  |  |   | 36 40               | 186 7                     | 70          | G.             | Ditto.   |
| $\odot$ — 10.         | Noon.                        |   |  |   | 38 5                | 185 7                     | 70          | G.             | Latitude by accour..   |
| $\odot$ — 11.         | Noon.                        | 73 24   |  |   | 38 4 $\frac{1}{4}$  | 185 18                    | 69          | G.             | $\odot$ 's Merid Altit. Poop.  |
| $\odot$ — 12.         | Noon.                        |   |  |   |                     | 185 18 $\frac{1}{2}$      | 67          | G.             |  |
| $\odot$ — 13.         | Noon.                        | 71 36   |  |   | 39 31 $\frac{5}{6}$ | 185 58                    | 64          | G.             | $\odot$ 's Merid. Altit. Q. D.   |
| $\odot$ — 14.         | Noon.                        | 70 30   |  |   | 40 27               | 184 59                    | 62          | G.             | Ditto.   |
|                       | 19 5 5                       | 25 27 $\frac{1}{3}$                               | 26 35 $\frac{1}{2}$ U.   | 124 50 50                                 |                     | 184 53 $\frac{1}{4}$      | *           | G.             | <div> <math>\odot</math> &amp; <math>\odot</math>. { In the entrance<br/>into Queen<br/>Charlotte's<br/>Sound, New<br/>Zealand. </div>                   |
|                       | 19 12 42                     | 26 53   | 25 16 $\frac{2}{3}$ U.   | 124 47 0                                  | 40 56 $\frac{1}{2}$ | 185 10 $\frac{3}{8}$      | *           | G.             |  |
|                       | 19 18 6 $\frac{1}{2}$        | 27 54   | 24 25 $\frac{2}{3}$ U.   | 124 44 30                                 |                     | 185 14 $\frac{3}{8}$      | *           | G.             |  |
| $\odot$ — 15.         | Noon.                        |   |  |   |                     |                           | 62          |                |  |
| $\odot$ — 16.         | Noon.                        |   |  |   | 41 5 $\frac{1}{2}$  | 185 16 $\frac{3}{4}$      | 69          | G.             | Latit. observed.   |
|                       | 21 39 5                      | 53 39 $\frac{2}{3}$                               | 22 11 $\frac{1}{4}$ C.   | 96 27 30                                  |                     | 185 7 $\frac{1}{4}$       | *           | G.             | <div> <math>\odot</math> &amp; <math>\odot</math>. { Quar.<br/>Deck. </div>  |
|                       | 21 46 14                     | 54 53   | 20 53 C.   | 96 24 50                                  | 41 6                | 184 53 $\frac{5}{8}$      | *           | G.             |  |
|                       | 21 50 13                     | 55 33 $\frac{1}{2}$                               | 20 10 $\frac{1}{3}$ C.   | 96 22 50                                  |                     | 185 0 $\frac{3}{4}$       | *           | G.             |  |
| $\odot$ — 17.         | Noon.                        |   |  |   |                     |                           | 69          |                |  |
|                       | 21 28 28                     | 71 40 $\frac{1}{3}$                               | 35 55 $\frac{1}{4}$ U.   | 88 0 35                                   |                     | 184 23 $\frac{5}{8}$      | *           | G.             | <div> <math>\odot</math> &amp; <math>\odot</math>. { Quar.<br/>Deck. </div>  |
|                       | 21 34 20                     | 52 41 $\frac{5}{6}$                               | 34 48 $\frac{2}{3}$ U.   | 87 58 55                                  | 41 6                | 184 7 $\frac{1}{4}$       | *           | G.             |  |
|                       | 21 39 32                     | 53 55 $\frac{2}{3}$                               | 33 55 U.   | 87 56 50                                  |                     | 184 12 $\frac{3}{8}$      | *           | G.             |  |
| $\odot$ — 18.         | Noon.                        |   |  |   |                     |                           | 72          |                |  |
|                       | 21 48 17                     | 54 56 $\frac{1}{2}$                               | 42 50 $\frac{2}{3}$ U.   | 76 36 40                                  |                     | 184 32 $\frac{3}{4}$      | *           | G.             | <div> <math>\odot</math> &amp; <math>\odot</math>. { Poop. </div>  |
|                       | 21 54 49                     | 56 1 $\frac{2}{3}$                                | 41 50 $\frac{2}{3}$ U.   | 76 34 45                                  | 41 6                | 184 21 $\frac{1}{2}$      | *           | G.             |  |
|                       | 21 59 13                     | 56 45   | 40 57 $\frac{1}{2}$ U.   | 76 33 15                                  |                     | 184 21 $\frac{1}{2}$      | *           | G.             |  |
| $\odot$ — 19.         | Noon.                        |   |  |   |                     |                           | 72          |                |  |
|                       | 21 30 30                     | 51 44 $\frac{2}{3}$                               | 56 1 $\frac{2}{3}$ U.  | 65 38 0                                   | 41 5                | 184 11 $\frac{1}{4}$      | *           | G.             | Latit. observed.   |
|                       | 21 35 12 $\frac{1}{2}$       | 52 33 $\frac{2}{3}$                               | 55 17 $\frac{1}{6}$ U.   | 65 36 0                                   | 41 6                | 184 28 $\frac{7}{8}$      | *           | G.             | <div> <math>\odot</math> &amp; <math>\odot</math>. { Poop. </div>  |
|                       | 21 39 55 $\frac{1}{2}$       | 53 22 $\frac{1}{3}$                               | 54 35 U.   | 65 35 c                                   |                     | 184 13 $\frac{3}{8}$      | *           | G.             |  |
| $\odot$ — 20.         | Noon.                        |   |  |   |                     |                           | 72          |                |  |
|                       | 21 25 32                     | 50 43 $\frac{1}{3}$                               | 63 58 $\frac{2}{3}$ C.   | 54 41 50                                  |                     | 184 10 $\frac{1}{4}$      | *           | G.             | <div> <math>\odot</math> &amp; <math>\odot</math>. { Quar.<br/>Deck. </div>  |
|                       | 21 30 43                     | 51 37 $\frac{2}{3}$                               | 63 15 C.   | 54 40 0                                   | 41 6                | 184 21 $\frac{5}{8}$      | *           | G.             |  |
|                       | 21 37 36                     | 52 49   | 62 14 $\frac{3}{4}$ C.   | 54 37 40                                  |                     | 184 33 $\frac{5}{8}$      | *           | G.             |  |
| $\odot$ — 21.         | Noon.                        |   |  |   |                     |                           | 71          |                |  |
| $\odot$ — 22.         | Noon.                        |   |  |   |                     |                           | 70          |                |  |
| $\odot$ — 23.         | Noon.                        |   |  |   |                     |                           | 72          |                |  |
| $\odot$ — 24.         | Noon.                        |   |  |   |                     |                           | 72          |                |  |
| $\odot$ — 25.         | Noon.                        |   |  |   |                     |                           | 71          |                |  |
|                       | 22 25 0                      | High Water in Queen Charlotte's Sound.            |  |   |                     |                           |             |                |  |
| $\odot$ — 26.         | Noon.                        |   |  |   |                     |                           | 72          |                |  |
|                       | 22 0 0                       | High Water. Violent puffs of wind from the hills. |  |   |                     |                           |             |                |  |
| $\odot$ — 27.         | Noon.                        |   |  |   |                     |                           | 70          |                |  |

In Queen Charlotte's Sound, New Zealand.



| 1770.    | Time by the Watch. | Alt. ☉'s L.L. or * | Moon's Altitude. | Dist. ☽'s L. from ☉ or *. | Ship's Latit. S. | Long. W. of Greenwich. | Thermo. | Obser. | PHENOMENA AND REMARKS.                                     |
|----------|--------------------|--------------------|------------------|---------------------------|------------------|------------------------|---------|--------|--|
| Jan. 28. | Noon.              |                    |                  |                           |                  |                        | 68      |        |  |
| — 29.    | Noon.              |                    |                  |                           |                  |                        | 68      |        |  |
| — 30.    | Noon.              |                    |                  |                           |                  |                        |         |        |  |
| — 31.    | Noon.              |                    |                  |                           |                  |                        | 69      |        |  |
| Feb. 1.  | Noon.              |                    |                  |                           |                  |                        | 70      |        | In Queen Charlotte's Sound, New Zealand.                   |
| — 2.     | Noon.              |                    |                  |                           |                  |                        | 70      |        |  |
| — 3.     | Noon.              |                    |                  |                           |                  |                        | 71      |        |  |
| — 4.     | Noon.              |                    |                  |                           |                  |                        | 70      |        |  |
| — 5.     | Noon.              |                    |                  |                           |                  |                        | 70      |        |  |
| — 6.     | Noon.              |                    |                  |                           | 41 4             | 185 10                 | 69      |        | Latitude observed.   |
| — 7.     | Noon.              | 63 23              |                  |                           | 41 26½           | 185 3                  | 66      | G.     | ☉'s Merid. Altit. Poop.                                    |
| — 8.     | Noon.              |                    |                  |                           | 41 30            | 184 4                  | 64      |        | Latitude by account.                                       |
| — 9.     | Noon.              | 63 15              |                  |                           | 40 55½           | 183 32                 | 67      | G.     | ☉'s Merid. Altit. Q. D.                                    |
| — 10.    | Noon.              |                    |                  |                           | 41 06            | 183 4½                 | 64      | G.     | Latitude observed.   |
| — 11.    | Noon.              | 62 28              |                  |                           | 41 3½            | 183 5½                 | 68      | G.     | ☉'s Merid. Altit. Poop.                                    |
| — 12.    | Noon.              | 61 20              |                  |                           | 41 51½           | 184 25                 |         | G.     | Ditto. Quarter Deck.                                       |
| — 13.    | Noon.              | 60 50              |                  |                           | 42 2½            | 184 37½                | 70      | G.     | Ditto.   |
|          | 19 43 32           | 25 19              | 31 15½ U.        | 120 42 20                 |                  | 185 20½                |         | G.     | ☽ & ☉. Observed on the Q. D. A little hazy.                |
|          | 19 52 40           | 27 1½              | 29 41 U.         | 120 37 20                 | 42 31½           | 186 1½                 |         | G.     | ☽ & ☉. Land from N. to S. by W. by comp.                   |
|          | 20 0 5             | 28 20½             | 28 23 U.         | 120 34 30                 |                  | 185 59                 |         | G.     |  |
| — 14.    | Noon.              |                    |                  |                           | 42 34            | 186 1½                 | 70      |        | Lat. obs. by Capt. Cook.                                   |
| — 15.    | Noon.              | 59 14              |                  |                           | 42 56            | 186 23½                | 70      | G.     | ☉'s Merid. Altit. Q. D.                                    |
|          | 21 4 22            | 39 19              | 37 40½ U.        | 97 10 0                   |                  | 186 31½                |         | G.     | ☽ & ☉. Observed on the Poop. Very clear and distinct.      |
|          | 21 14 1            | 40 54½             | 36 1½ U.         | 97 6 30                   |                  | 186 32½                |         | G.     | ☽ & ☉. Southern Island of New Zealand S. W.                |
|          | 21 19 42           | 41 49½             | 35 3½ U.         | 97 4 30                   | 43 7½            | 186 30½                |         | G.     | ☽ & ☉. ½ S. to S. ½ W. by compass.                         |
|          | 21 28 57           | 43 17              | 33 22½ U.        | 97 1 0                    |                  | 186 33½                | *       |        | ☽ & ☉. Distance by Mr. Monkhouse. Poop.                    |
|          |                    | 44 22½             | 32 13½ U.        | 96 56 45                  |                  | 187 24½                | *       |        | ☽ & ☉. Distance by Mr. Clerke. Poop.                       |
| — 16.    | Noon.              | 58 33              |                  |                           | 43 16            | 186 40½                | 70      | G.     | ☉'s Merid. Altit. Q. D.                                    |
|          | 19 57 12           | 26 33½             | 58 7 U.          | 86 25 40                  |                  | 186 19½                | *       | G.     | ☽ & ☉. Very good observing. The extremes of Banks's Island |
|          | 19 57 12           | 26 33½             | 58 7 U.          | 86 22 10                  |                  | 188 14½                | *       | C.     | ☽ & ☉. N. 13° W. and N. 57° W. by comp. Obser.             |
|          | 20 6 24            | 28 8½              | 56 48½ U.        | 86 22 30                  |                  | 186 36½                | *       | G.     | ☽ & ☉. on the Poop.  |
|          | 20 6 24            | 28 8½              | 56 48½ U.        | 86 20 30                  | 44 3             | 187 42½                | *       | C.     |  |
|          | 20 14 27           | 29 34½             | 55 36 U.         | 86 19 20                  |                  | 186 59                 | *       | G.     |  |
|          | 20 14 27           | 29 34½             | 55 36 U.         | 86 18 10                  |                  | 187 38½                | *       | C.     |  |

I strongly suspect there was an error of about 3' in Captain Cook's quadrant which Mr. Green has not known of, or which he has omitted transcribing from his memorandum book, when these observations were made; for though Captain Cook has not given down the longitude of the ship which results from them, he has said, "The longitude of Banks's Island is 186° 30' west by observations of the sun and moon, made this morning." But his distances, as I find them, would give the longitude of that Island, at least, a degree and a half greater than that quantity.

## ASTRONOMICAL OBSERVATIONS.

| 1770.    | Time by the Watch. | Alt. $\odot$ 's<br>L. L. or * | Moon's<br>Altitude.    | Dist. $\odot$ 's L.<br>from $\odot$ or * | Ship's<br>Latit. S. | Long. W. of<br>Greenwich. | Thermo. | Ob-<br>serv. | PHENOMENA<br>AND<br>REMARKS.  |
|----------|--------------------|-------------------------------|------------------------|--|---------------------|---------------------------|---------|--------------|---|
|          | H / "              | ° / '                         | ° / '                  | ° / ' / "                                | ° / '               | ° / '                     |         |              |   |
| Feb. 17. | Noon.              | 57 21                         |                        |  | 44 7 $\frac{1}{4}$  | 186 41 $\frac{1}{2}$      | 74      | G.           | $\odot$ 's Merid. Alt. Poop.  |
| 18.      | Noon.              | 55 55                         |                        |  | 45 12               | 186 51 $\frac{1}{4}$      | 68      | G.           | Ditto.  |
| 19.      | Noon.              | 56 7                          |                        |  | 44 38 $\frac{1}{4}$ | 188 51 $\frac{1}{2}$      | 60      | G.           | Ditto. Main Deck.   |
| 20.      | Noon.              | 55 40                         |                        |  | 44 43 $\frac{3}{4}$ | 189 15                    | 60      | G.           | Ditto.  |
|          | 20 26 56           | 33 29 $\frac{1}{3}$           | 62 41 L.               | 42 21 10                                 |                     | 187 9 $\frac{1}{4}$       |         | G.           | D & $\odot$ . { Ten or 12 leagues from the Land, which bore W. Poop.  |
|          | 20 35 12           | 34 54 $\frac{1}{3}$           | 63 7 $\frac{1}{2}$ L.  | 42 18 30                                 | 44 34               | 187 13 $\frac{3}{4}$      |         | G.           |   |
|          | 20 43 22           | 36 14                         | 63 15 $\frac{1}{2}$ L. | 42 16 45                                 |                     | 186 58 $\frac{1}{4}$      |         | G.           |   |
| 21.      | Noon.              | 55 27                         |                        |  | 44 34 $\frac{5}{8}$ | 188 54 $\frac{1}{2}$      | 58      | G.           | $\odot$ 's Merid. Alt. M. D.  |
| 22.      | Noon.              |                               |                        |  | 44 35               | 188 53                    | 60      | G.           | Latitude by account.  |
| 23.      | Noon.              | 54 38                         |                        |  | 44 39 $\frac{5}{8}$ | 188 29 $\frac{1}{2}$      | 64      | G.           | $\odot$ 's Merid. Alt. M. D.  |
| 24.      | Noon.              | 53 36                         |                        |  | 45 19 $\frac{3}{4}$ | 188 56 $\frac{3}{4}$      | 64      | G.           | Ditto.  |
| 25.      | Noon.              |                               |                        |  | 46 00               | 189 38                    | 69      |              | Latitude by account.  |
| 26.      | Noon.              | 51 36                         |                        |  | 46 36               | 189 0 $\frac{1}{2}$       | 54      | G.           | $\odot$ 's Merid. Alt. M. D.  |
| 27.      | Noon.              |                               |                        |  | 46 54               | 188 34                    | 55      |              | Latitude by account.  |
| 28.      | Noon.              | 49 44 $\frac{1}{2}$           |                        |  | 47 40 $\frac{2}{3}$ | 187 37                    | 57      | G.           | $\odot$ 's Merid. Alt. M. D.  |
| Mar. 1.  | Noon.              |                               |                        |  | 47 52               | 188 36 $\frac{1}{2}$      | 57      |              | Latitude by account.  |
| 2.       | Noon.              | 49 52                         |                        |  | 46 48               | 188 35 $\frac{1}{4}$      | 57      | G.           | $\odot$ 's Merid. Alt. M. D.  |
| 3.       | Noon.              | 49 35                         |                        |  | 46 42               | 188 17 $\frac{1}{2}$      | 58      | G.           | Ditto.  |
|          | 3 18 23            | 31 33 $\frac{2}{3}$           | 16 40 $\frac{2}{3}$ U. | 80 50 00                                 |                     | 189 0 $\frac{1}{4}$       | *       | G.           | D & $\odot$ . { Very clear and distinct. Observed on the P.   |
|          | 3 27 32            | 30 9 $\frac{2}{3}$            | 17 20 U.               | 80 53 10                                 | 46 37 $\frac{1}{2}$ | 188 53 $\frac{1}{2}$      | *       | G.           |   |
|          | 3 34 57            | 29 0 $\frac{2}{3}$            | 17 50 $\frac{1}{3}$ U. | 80 56 10                                 |                     | 188 54 $\frac{1}{2}$      | *       | G.           |   |
| 4.       | Noon.              | 49 23                         |                        |  | 46 30 $\frac{1}{4}$ | 189 35 $\frac{1}{2}$      | 59      | G.           | $\odot$ 's Merid. Alt. M. D.  |
|          | 5 16 20            | 14 20 $\frac{2}{3}$           | 18 47 $\frac{2}{3}$ U. | 94 37 47                                 |                     | 190 34 $\frac{1}{2}$      | *       | G.           | D & $\odot$ . { Very good. Land from N. by E. to W. S. W. by com. P.  |
|          | 5 16 50            | 13 13 $\frac{1}{3}$           | 19 6 $\frac{2}{3}$ U.  | 94 41 0                                  | 46 30 $\frac{1}{6}$ | 190 55 $\frac{1}{4}$      | *       | G.           |   |
|          | 5 21 36            | 12 21 $\frac{2}{3}$           | 19 20 $\frac{1}{3}$ U. | 94 42 20                                 |                     | 190 42 $\frac{1}{4}$      | *       | G.           |   |
| 5.       | Noon.              |                               |                        |  | 46 50               | 191 37                    | 59      |              | Latitude by account.  |
| 6.       | Noon.              | 48 18                         |                        |  | 46 49 $\frac{1}{2}$ | 191 37                    | 57      | G.           | $\odot$ 's Meridian Altitude.   |
| 7.       | Noon.              |                               |                        |  | 47 6                | 191 25                    | 60      |              | Latitude by account.  |
| 8.       | Noon.              | 47 8                          |                        |  | 47 13               | 191 45 $\frac{1}{4}$      | 60      | G.           | $\odot$ 's Meridian Altitude.   |
| 9.       | Noon.              | 46 32                         |                        |  | 47 25 $\frac{1}{6}$ | 192 32 $\frac{1}{2}$      | 64      | G.           | $\odot$ 's Merid. Alt. The South Cape N. 72° W.   |
| 10.      | Noon.              |                               |                        |  | 47 33               | 193 49 $\frac{3}{4}$      |         |              | Latitude by observation.  |
| 11.      | Noon.              |                               |                        |  | 46 24               | 193 17                    | 62      |              | Latitude observed.  |
| 12.      | Noon.              |                               |                        |  | 47 38               | 194 14                    | 60      |              | Latitude by account.  |
| 13.      | Noon.              |                               |                        |  | 46 00               | 194 27                    | 68      |              | Latitude observed.  |
| 14.      | Noon.              |                               |                        |  | 45 13               | 193 29                    | 64      |              | Ditto.  |
| 15.      | Noon.              |                               |                        |  | 44 47               | 192 53                    |         |              | Ditto.  |
| 16.      | Noon.              |                               |                        |  | 44 5                | 191 44                    |         |              | Ditto.  |
| 17.      | Noon.              |                               |                        |  | 43 34 $\frac{1}{2}$ | 190 47                    | 66      |              | Latitude by account.  |
|          | 18 55 47           | 14 22 $\frac{1}{3}$           | 59 31 U.               | 95 47 30                                 |                     | 189 27 $\frac{1}{4}$      | *       | G.           | D & $\odot$ . { A high & land troublesome observing. P. Land from S. W. by S. to N. E. by E. by C. Off shore 6 m. |
|          | 19 3 21            | 15 39                         | 58 22 $\frac{2}{3}$ U. | 95 45 20                                 | 43 8                | 189 36 $\frac{1}{2}$      | *       | G.           |   |
|          | 19 9 29            | 16 45 $\frac{2}{3}$           | 57 26 $\frac{2}{3}$ U. | 95 43 00                                 |                     | 189 56                    | *       | G.           |   |



## 51

| Time by the Watch. |       | Alt. $\odot$ 's<br>L.L. or * | Moon's<br>Altitude.    | Dist. $\odot$ 's L.<br>from $\odot$ or *. | Ship's<br>Latit. S. | Long. W. of<br>Greenwich. | Ther. no. | Oblect. | PHENOMENA<br>AND<br>REMARKS.  |
|--------------------|-------|------------------------------|------------------------|---|---------------------|---------------------------|-----------|---------|---|
| H                  | ' "   | ' "                          | ' "                    | ' "                                       | ' "                 | ' "                       |           |         |   |
| ur. 18.            | Noon. |                              |                        |   | 43 4                | 189 39                    | 67        |         | Latitude observed.  |
| 21                 | 57 16 | 40 39                        | 39 10 $\frac{1}{2}$ U. | 84 0 40                                   |                     | 188 18 $\frac{1}{2}$      | *         | G.      | Objects very<br>distinct. The<br>Land from N.<br>E. by N. to S.<br>Off shore 3 or 4<br>leagues. Forec.  |
| 22                 | 3 7   | 41 20 $\frac{1}{2}$          | 38 4 $\frac{2}{3}$ U.  | 83 58 27                                  | 42 10 $\frac{2}{3}$ | 188 20                    | *         | G.      |   |
| 22                 | 8 17  | 41 56 $\frac{2}{3}$          | 37 9 U.                | 83 56 30                                  |                     | 188 18 $\frac{3}{8}$      | *         | G.      |   |
|                    |       |                              |                        |   |                     |                           |           |         |   |
| 19.                | Noon. | 47 53                        |                        |   | 42 8 $\frac{1}{2}$  | 188 44 $\frac{1}{2}$      | 68        | G.      | $\odot$ 's Merid. Altit. Q. D.  |
| 20.                | Noon. |                              |                        |   | 42 23               | 189 52 $\frac{1}{2}$      | 70        |         | Latitude by account.  |
| 21.                | Noon. |                              |                        |   | 41 37               | 188 7                     | 69        |         | Latitude observed.  |
| 22.                | Noon. | 47 59 $\frac{1}{2}$          |                        |   | 40 51 $\frac{1}{2}$ | 187 11 $\frac{1}{4}$      | 66        | G.      | $\odot$ 's M. Alt. Forec. Clou.   |
| 19                 | 14 50 | 13 50                        | 48 5 L.                | 40 12 40                                  | 40 40 $\frac{3}{4}$ | 187 12                    | *         | G.      | Very clear and<br>distinct. The<br>three first ob-<br>served on the<br>Forecastle, the<br>three latter on<br>the Poop. Cape<br>Farewell N.<br>73° E. true,<br>distant 5 leag. |
| 19                 | 23 6  | 15 16                        | 49 12 L.               | 40 11 0                                   | 40 40 $\frac{3}{4}$ | 186 52 $\frac{7}{8}$      | *         | G.      |   |
| 19                 | 29 17 | 16 28 $\frac{1}{3}$          | 50 1 L.                | 40 8 50                                   | 40 40 $\frac{1}{4}$ | 187 3                     | *         | G.      |   |
| 21                 | 38 22 | 37 5                         | 57 39 $\frac{1}{2}$ L. | 39 31 52                                  | 40 38 $\frac{5}{6}$ | 186 58 $\frac{3}{4}$      | *         | G.      |   |
| 21                 | 48 1  | 38 29 $\frac{2}{3}$          | 57 20 $\frac{1}{2}$ L. | 39 28 50                                  | 40 38 $\frac{5}{6}$ | 186 54 $\frac{1}{2}$      | *         | G.      |   |
| 21                 | 54 17 | 39 18 $\frac{1}{3}$          | 57 0 $\frac{2}{3}$ L.  | 39 27 0                                   | 40 38 $\frac{5}{6}$ | 186 52 $\frac{3}{4}$      | *         | G.      |   |
| 23                 | 10 5  | 46 2 $\frac{1}{2}$           | 51 22 U.               | 39 6 0                                    | 40 38 $\frac{1}{2}$ | 186 40 $\frac{1}{2}$      | *         | G.      | Very good<br>Bearings near-<br>ly as above;<br>it being calm.<br>Quar. Deck.  |
| 23                 | 17 53 | 46 34 $\frac{1}{6}$          | 50 21 U.               | 39 3 30                                   | 40 38 $\frac{1}{2}$ | 186 26 $\frac{2}{3}$      | *         | G.      |   |
| 23                 | 25 32 | 46 54                        | 49 22 $\frac{2}{3}$ U. | 39 1 40                                   | 40 38 $\frac{1}{2}$ | 186 19 $\frac{3}{4}$      | *         | G.      |   |
| 23.                | Noon. | 47 49                        |                        |   | 40 38 $\frac{1}{2}$ | 186 53 $\frac{1}{4}$      | 66        | G.      | $\odot$ 's Merid. Altit. Q. D.  |
| 24.                | Noon. | 47 42                        |                        |   | 40 21 $\frac{1}{2}$ | 186 18 $\frac{3}{4}$      | 62        | G.      | $\odot$ 's Merid. Altit. Forec.   |
| 25.                | Noon. |                              |                        |   | 40 20               | 186 20 $\frac{1}{2}$      | 62        |         | Latitude by account.  |
| 26.                | Noon. | 46 44                        |                        |   | 40 32 $\frac{1}{4}$ | 185 37 $\frac{1}{2}$      | 67        | G.      | $\odot$ 's Merid. Altit. Q. D.  |
| 27.                | Noon. |                              |                        |   |                     | 185 36                    | 66        |         |   |
| 28.                | Noon. |                              |                        |   |                     |                           | 70        |         |   |
| 29.                | Noon. |                              |                        |   |                     |                           | 65        |         | At anchor in Admiralty Bay, New Zealand.  |
| 30.                | Noon. |                              |                        |   |                     |                           |           |         |   |
| 31.                | Noon. |                              |                        |   |                     |                           |           |         |   |
| April 1.           | Noon. |                              |                        |   | 40 35               | 187 37                    | 66        |         | Latitude observed.  |
| 2.                 | Noon. | 44 34                        |                        |   | 40 12               | 188 57                    | 68        | G.      | Latitude by account.  |
| 3.                 | Noon. | 45 14                        |                        |   | 39 59 $\frac{1}{4}$ | 188 57                    | 68        | G.      | $\odot$ 's Meridian Altitude.   |
| 4.                 | Noon. | 45 51                        |                        |   | 38 56 $\frac{1}{2}$ | 191 2                     | 68        | G.      | Ditto.  |
| 5.                 | Noon. | 46 1                         |                        |   | 37 56 $\frac{1}{4}$ | 193 19                    | 66        | G.      | Ditto.  |
| 6.                 | Noon. | 45 43                        |                        |   | 37 23 $\frac{1}{2}$ | 195 35                    | 62        | G.      | Ditto.  |
| 7.                 | Noon. | 45 21                        |                        |   | 37 18 $\frac{1}{2}$ | 197 0                     | 70        | G.      | Ditto.  |
| 8.                 | Noon. | 44 16                        |                        |   | 37 36 $\frac{3}{4}$ | 197 59                    | 69        | G.      | Ditto.  |
| 9.                 | Noon. | 44 25                        |                        |   | 38 0 $\frac{1}{4}$  | 199 26                    | 71        | G.      | Ditto.  |
| 10.                | Noon. | 43 10                        |                        |   | 38 29 $\frac{1}{2}$ | 201 9                     | 69        | G.      | Ditto.  |
| 11.                | Noon. | 41 56                        |                        |   | 38 52 $\frac{1}{2}$ | 203 9                     | 71        | G.      | Ditto.  |
| 12.                | Noon. | 41 36                        |                        |   | 39 14 $\frac{1}{6}$ | 2 3 47                    | 74        | G.      | Ditto.  |
| 13.                | Noon. | 41 3                         |                        |   | 39 12 $\frac{1}{2}$ | 203 59                    | 72        | G.      | Ditto.  |
| 14.                | Noon. |                              |                        |   | 39 23 $\frac{2}{3}$ | 204 27                    | 76        | G.      | Ditto.  |
| 15.                | Noon. |                              |                        |   | 39 25               | 204 44                    | 74        |         | Latitude observed.  |
|                    |       |                              |                        |   | 39 30               | 206 25                    |           |         | Ditto.  |

## ASTRONOMICAL OBSERVATIONS.

| 1770.     | Time by the<br>Watch. | Alt. $\odot$ 's<br>L.L. or * | Moon's<br>Altitude.    | Dist. $\odot$ 's L.<br>from $\odot$ or * | Ship's<br>Lat. S.   | Long. W. of<br>Greenwich. | Thermo. | Obsev. | PHENOMENA<br>AND<br>REMARKS.              |
|-----------|-----------------------|------------------------------|------------------------|--|---------------------|---------------------------|---------|--------|---|
| H         | "                     | "                            | "                      | "  | "                   | "                         | "       | "      | "   |
| April 16. | Noon.                 |                              |                        |  | 39 45               | 208 25                    |         |        | Latitude observed.                        |
| 22        | 58 55                 | 37 24 $\frac{2}{3}$          | 22 42 U.               | 91 55 50                                 |                     | 207 3 $\frac{1}{4}$       | *       | G.     | $\odot$ & $\odot$ .                       |
| 22        | 58 55                 | 37 24 $\frac{2}{3}$          | 22 42 U.               | 91 53 00                                 |                     | 208 36 $\frac{1}{4}$      | *       | C.     | $\odot$ & $\odot$ .                       |
| 23        | 7 13                  | 37 59 $\frac{1}{3}$          | 20 57 $\frac{2}{3}$ U. | 91 51 30                                 | 39 40               | 207 6 $\frac{1}{4}$       | *       | G.     | $\odot$ & $\odot$ . Very good.            |
| 23        | 7 13                  | 37 59 $\frac{1}{3}$          | 20 57 $\frac{2}{3}$ U. | 91 50 0                                  |                     | 207 55 $\frac{1}{4}$      | *       | C.     | $\odot$ & $\odot$ . Observed on           |
| 23        | 15 2                  | 38 22                        | 19 27 $\frac{2}{3}$ U. | 91 47 20                                 |                     | 207 32 $\frac{1}{2}$      | *       | G.     | $\odot$ & $\odot$ . the Quarter           |
| 23        | 15 2                  | 38 22                        | 19 27 $\frac{2}{3}$ U. | 91 45 30                                 |                     | 208 30 $\frac{3}{4}$      | *       | C.     | $\odot$ & $\odot$ . Deck.                 |
| ♂ — 17.   | Noon.                 | 39 21                        |                        |  | 39 40 $\frac{1}{2}$ | 208 44                    | 62      | G.     | $\odot$ 's Meridian Altitude.             |
| ♀ — 18.   | Noon.                 |                              |                        |  | 38 45               | 210 5                     |         |        | Latitude observed.                        |
| ♂ — 19.   | Noon.                 |                              |                        |  | 37 50               | 210 44 $\frac{1}{2}$      |         |        | Ditto.                                    |
| 22        | 49 26                 | 38 30                        | 42 13 $\frac{2}{3}$ U. | 58 5 50                                  |                     | 209 43 $\frac{1}{4}$      | *       | G.     | $\odot$ & $\odot$ . Very clear, &         |
| 22        | 49 26                 | 38 30                        | 42 13 $\frac{2}{3}$ U. | 58 6 10                                  |                     | 209 33                    | *       | C.     | $\odot$ & $\odot$ . good horizon.         |
| 22        | 55 47                 | 38 54 $\frac{1}{3}$          | 41 10 $\frac{5}{6}$ U. | 58 2 30                                  | 36 54 $\frac{1}{2}$ | 210 26                    | *       | G.     | $\odot$ & $\odot$ . Poop. New             |
| 22        | 55 47                 | 38 54 $\frac{1}{3}$          | 41 10 $\frac{5}{6}$ U. | 58 3 40                                  |                     | 209 50                    | *       | C.     | $\odot$ & $\odot$ . Holland from          |
| 23        | 1 48                  | 39 16 $\frac{1}{3}$          | 40 3 U.                | 58 0 5                                   |                     | 210 42                    | *       | G.     | $\odot$ & $\odot$ . S. to N.N.W.          |
| 23        | 1 48                  | 39 16 $\frac{1}{3}$          | 40 3 U.                | 58 2 10                                  |                     | 209 37 $\frac{1}{2}$      | *       | C.     | $\odot$ & $\odot$ . by comp. Off          |
| ♀ — 20.   | Noon.                 | 41 8                         |                        |  | 36 51 $\frac{1}{2}$ | 210 10                    | 64      | G.     | $\odot$ 's Merid. Altit. Poop.            |
| 22        | 11 7                  | 35 17 $\frac{1}{3}$          | 51 5 $\frac{2}{3}$ U.  | 46 27 40                                 |                     | 209 6 $\frac{5}{6}$       | *       | G.     | $\odot$ & $\odot$ . Very good.            |
| 22        | 11 7                  | 35 17 $\frac{1}{3}$          | 51 5 $\frac{2}{3}$ U.  | 46 28 50                                 |                     | 208 31                    | *       | C.     | $\odot$ & $\odot$ . Land from S.          |
| 22        | 18 35                 | 36 7 $\frac{1}{3}$           | 50 12 $\frac{1}{3}$ U. | 46 25 0                                  | 36 1                | 209 11 $\frac{3}{4}$      | *       | G.     | $\odot$ & $\odot$ . W. by S. to N.        |
| 22        | 18 35                 | 36 7 $\frac{1}{3}$           | 50 12 $\frac{1}{3}$ U. | 46 23 50                                 |                     | 209 47                    | *       | C.     | $\odot$ & $\odot$ . by E. Cape            |
| 22        | 25 7                  | 36 46 $\frac{2}{3}$          | 49 28 $\frac{1}{3}$ U. | 46 22 40                                 |                     | 209 20                    | *       | G.     | $\odot$ & $\odot$ . Dromedary S.          |
| 22        | 25 7                  | 36 46 $\frac{2}{3}$          | 49 28 $\frac{1}{3}$ U. | 46 22 20                                 |                     | 209 30                    | *       | C.     | $\odot$ & $\odot$ . W. $\frac{1}{2}$ W. 4 |
| ♂ — 21.   | Noon.                 | 41 46                        |                        |  | 35 53               | 209 53 $\frac{1}{4}$      | 64      | G.     | $\odot$ 's Meridian Altitude.             |
| ♀ — 22.   | Noon.                 |                              |                        |  | 35 27               | 209 44 $\frac{1}{2}$      | 67      | G.     | Latitude observed?                        |
| ♂ — 23.   | Noon.                 | 41 23                        |                        |  | 35 36               | 209 46 $\frac{1}{2}$      | 66      | G.     | $\odot$ 's Meridian Altitude.             |
| ♀ — 24.   | Noon.                 | 41 29 $\frac{1}{2}$          |                        |  | 35 10 $\frac{1}{2}$ | 209 11 $\frac{1}{3}$      | 71      | G.     | Ditto. The Pidgeon                        |
| ♂ — 25.   | Noon.                 | 41 57                        |                        |  | 34 23 $\frac{1}{2}$ | 208 57 $\frac{1}{2}$      | 64      | G.     | Houfe S. 62° W.                           |
| ♀ — 26.   | Noon.                 | 41 48 $\frac{1}{2}$          |                        |  | 34 12 $\frac{3}{4}$ | 208 46                    | 68      | G.     | Ditto.                                    |
| ♂ — 27.   | Noon.                 | 41 21                        |                        |  | 34 21 $\frac{1}{4}$ | 208 57 $\frac{1}{2}$      | 70      | G.     | Ditto. Land from S. 27°                   |
| ♀ — 28.   | Noon.                 |                              |                        |  |                     |                           | 70      |        | W. to N. 5° W.                            |
| ♂ — 29.   | Noon.                 |                              |                        |  |                     |                           | 70      |        | Ditto. Land from S. 10°                   |
| ♀ — 30.   | Noon.                 | 40 39 $\frac{1}{2}$          |                        |  | 34 6                |                           | 71      | G.     | W. to N. 20° E.                           |
| ♂ May 1.  | Noon.                 |                              |                        |  |                     |                           | 70      |        | $\odot$ 's M. Alt. Dip 3'.                |
| 3         | 38 22                 | 20 27                        | 28 40 $\frac{2}{3}$ U. | 87 26 35                                 |                     | 208 47                    | 70      | G.     | $\odot$ & $\odot$ .                       |
| 3         | 48 10                 | 18 48                        | 30 8 $\frac{2}{3}$ U.  | 87 31 5                                  |                     | 209 10 $\frac{2}{3}$      | *       | G.     | $\odot$ & $\odot$ . Dip 3'.               |
| 3         | 56 13                 | 17 30 $\frac{2}{3}$          | 31 12 $\frac{2}{3}$ U. | 87 34 50                                 |                     | 209 37 $\frac{1}{8}$      | *       | G.     | $\odot$ & $\odot$ .                       |
| ♀ — 2     | Noon.                 |                              |                        |  |                     |                           | 69      |        |   |
| 5         | 13 15                 | 5 4 $\frac{1}{3}$            | 37 25 U.               | 101 0 20                                 |                     | 210 30 $\frac{1}{4}$      | *       | G.     | $\odot$ & $\odot$ . Dip for               |
| 5         | 19 8                  | 4 0 $\frac{2}{3}$            | 38 9 $\frac{2}{3}$ U.  | 101 1 10                                 |                     | 210 30 $\frac{3}{4}$      | *       | G.     | $\odot$ & $\odot$ . $\odot$ 4' 22".       |
| 5         | 23 5                  | 3 14 $\frac{1}{2}$           | 38 42 $\frac{2}{3}$ U. | 101 0 40                                 |                     | 210 0 $\frac{1}{8}$       | *       | G.     | $\odot$ & $\odot$ . Dip for               |
| ♀ — 3     | Noon.                 |                              |                        |  |                     |                           | 70      |        | $\odot$ & $\odot$ . 6' 30".               |

In Borany Bay.

| 1770.    | Time by the Watch. | Alt. ☉'s L.L. or *         | Moon's Altitude.                                 | Diff. ☉'s L. from ☉ or * | Ship's Latit. S.    | Long. W. of Greenwich.         | Thermo. | Obser.   | PHENOMENA AND REMARKS.   |
|----------|--------------------|----------------------------|--|--------------------------|---------------------|--------------------------------|---------|----------|--|
|          | H / "              | ° / '                      | ° / '  | ° / ' / "                | ° / '               | ° / '                          |         |          |  |
| u May 3. | 3 45 50            | 16 26                      | 21 52 $\frac{1}{2}$ U.                           | 113 24 20                |                     | 209 12                         | *       | G.       | ☉ & ☉. { Dip to ☉ 3'00".   |
|          | 3 53.30            | 15 4                       | 23 13 U.   | 113 27 15                |                     | 209 5                          | *       | G.       | ☉ & ☉. { Dip to ☉ 6'00".   |
|          | 4 0 20             | 13 50                      | 24 24 $\frac{1}{2}$ U.                           | 113 31 10                |                     | 209 38 $\frac{1}{2}$           | *       | G.       | ☉ & ☉. { Dip to ☉ 6'00".   |
| ♀ — 4.   | Noon.              |                            |  |                          |                     |                                | 72      |          |  |
|          | About 5 o'Clock.   | 6 40<br>5 48 $\frac{2}{3}$ | 26 13 $\frac{2}{3}$ U.<br>27 15 $\frac{1}{3}$ U. | 126 16 27<br>126 18 27   |                     | 208 41<br>208 59 $\frac{1}{2}$ | *<br>*  | Cl<br>Cl | ☉ & ☉. { Dip for ☉ 6'00".<br>☉ & ☉. { Dip for ☉ 4'22".           |
| h — 5.   | Noon.              |                            |  |                          |                     |                                | 71      |          |  |
| ☉ — 6.   | Noon.              | 39 14                      |  |                          | 33 48 $\frac{1}{2}$ | 208 35 $\frac{1}{2}$           | 70      | G.       | ☉'s Merid. Alt. Nearest Land N. 83° W. 4 miles.                  |
| ☉ — 7.   | Noon.              | 39 24 $\frac{1}{2}$        |  |                          | 33 21 $\frac{1}{2}$ | 208 20 $\frac{3}{4}$           | 73      | G.       | Ditto. Nearest Land W. 5 miles.                                  |
| ♂ — 8.   | Noon.              | 39 6                       |  |                          | 33 24               | 208 21 $\frac{1}{8}$           | 73      | G.       | Ditto. Nearest Land N. 74° W. 4 miles.                           |
| ♀ — 9.   | Noon.              | 38 36                      |  |                          | 33 38               | 208 15 $\frac{2}{3}$           | 72      | G.       | Ditto. Quarter Deck.   |
| u — 10.  | Noon.              | 39 5                       |  |                          | 32 53 $\frac{1}{2}$ | 207 59 $\frac{1}{2}$           | 69      | G.       | Ditto. Nearest Land N. W. 8 or 9 miles.                          |
| ♀ — 11.  | Noon.              | 39 40                      |  |                          | 32 34               | 207 20 $\frac{1}{2}$           | 70      | G.       | Ditto. Forecastle.   |
| h — 12.  | Noon.              | 40 9                       |  |                          | 31 19 $\frac{1}{4}$ | 206 58 $\frac{1}{2}$           | 70      | G.       | Ditto. Nearest Land W. 12 miles.                                 |
| ☉ — 13.  | Noon.              | 40 30 $\frac{1}{2}$        |  |                          | 30 43               | 206 43 $\frac{1}{2}$           | 70      | G.       | Ditto. Smoky Cape S. 36° W.                                      |
| ☉ — 14.  | Noon.              | 40 37                      |  |                          | 30 22 $\frac{1}{2}$ | 206 34 $\frac{1}{2}$           | 69      | G.       | Ditto.   |
|          | 21 4 13            | 25 57 $\frac{2}{3}$        | 28 59 $\frac{1}{2}$ U.                           | 111 49 35                |                     | 205 30 $\frac{3}{4}$           | *       | G.       | ☉ & ☉. { Very good. M. D. Land from S. 18° W. 20 m.              |
|          | 21 16 10           | 27 51 $\frac{1}{2}$        | 26 21 U.   | 111 44 10                | 28 54 $\frac{1}{2}$ | 206 2 $\frac{1}{2}$            | *       | G.       | ☉ & ☉. { to N. 9° W. dist. 9 miles. Off shore 3 miles.           |
|          | 21 28 27           | 29 42                      | 23 42 $\frac{1}{2}$ U.                           | 111 40 0                 |                     | 205 30 $\frac{1}{2}$           | *       | G.       | ☉ & ☉. {   |
| ♂ — 15.  | Noon.              | 42 5                       |  |                          | 28 40               | 206 24 $\frac{1}{2}$           | 65      | G.       | ☉'s Meridian Altitude.   |
|          | 20 45 19           | 23 22                      | 40 50 $\frac{1}{2}$ U.                           | 100 53 5                 |                     | 205 15                         | *       | G.       | ☉ & ☉. { Cloudy. Mount Warning S. 28° W. Obs. on the M. D.       |
|          | 20 53 20           | 24 39 $\frac{1}{2}$        | 39 8 $\frac{2}{3}$ U.                            | 100 50 20                | 28 3                | 205 20                         | *       | G.       | ☉ & ☉. {   |
|          | 20 58 37           | 25 32                      | 38 1 U.  | 100 48 15                |                     | 205 28                         | *       | G.       | ☉ & ☉. {   |
| ♀ — 16.  | Noon.              | 42 44                      |  |                          | 27 48 $\frac{1}{2}$ | 206 24 $\frac{3}{4}$           | 68      | G.       | ☉'s Meridian Altitude.   |
|          | 22 29 52           | 38 50 $\frac{2}{3}$        | 26 0 $\frac{1}{2}$ U.                            | 89 2 40                  | 26 35               | 204 39 $\frac{3}{4}$           | *       | G.       | ☉ & ☉. { Very good. The Glass Houses S. 42° W. Obs. on the Poop. |
|          | 22 36 3            | 39 28 $\frac{1}{2}$        | 24 41 $\frac{2}{3}$ U.                           | 89 0 10                  | 26 34 $\frac{3}{4}$ | 204 38 $\frac{1}{2}$           | *       | G.       | ☉ & ☉. {   |
|          | 22 41 13           | 40 6 $\frac{1}{2}$         | 23 35 U.   | 88 58 15                 | 26 34 $\frac{2}{3}$ | 204 11 $\frac{1}{2}$           | *       | G.       | ☉ & ☉. {   |
| u — 17.  | Noon.              | 43 49                      |  |                          | 26 28 $\frac{3}{4}$ | 206 43 $\frac{3}{4}$           | 67      | G.       | ☉'s Meridian Altitude.   |
|          | 22 29 45           | 39 12 $\frac{1}{2}$        | 34 14 $\frac{1}{2}$ U.                           | 77 29 35                 |                     | 207 12                         | *       | G.       | ☉ & ☉. { Very good.  |
|          | 22 35 0            | 39 48                      | 33 7 $\frac{2}{3}$ U.                            | 77 28 20                 | 25 35               | 206 45 $\frac{1}{2}$           | *       | G.       | ☉ & ☉. { Observed on the M. Deck.                                |
|          | 22 39 55           | 40 15 $\frac{2}{3}$        | 32 4 U.  | 77 26 25                 |                     | 206 53                         | *       | G.       | ☉ & ☉. {   |
| ♀ — 18.  | Noon.              | 44 32                      |  |                          | 25 32 $\frac{2}{3}$ | 206 41 $\frac{1}{4}$           | 68      | G.       | ☉'s Meridian Altitude.   |
| h — 19.  | Noon.              | 44 48                      |  |                          | 25 4                | 206 33 $\frac{3}{4}$           | 70      | G.       | ☉'s Merid. Alt. Sandy Cape N. 35° W. 4 miles.                    |

## ASTRONOMICAL OBSERVATIONS.

| 1770.                 | Time by the Watch. |                     | Alt. $\odot$ 's<br>L.L.or* | Moon's<br>Altitude.    | Dist. $\odot$ 's L.<br>from $\odot$ or * | Ship's<br>Latit. S.  | Long. W. of<br>Greenwich. | Thermo. | Oberv. | PHENOMENA<br>AND<br>REMARKS.         |
|-----------------------|--------------------|---------------------|----------------------------|------------------------|--|----------------------|---------------------------|---------|--------|--------------------------------------|
|                       | H                  | "                   | o                          | '                      | o  | '                    | o                         | '       |        |                                      |
| $\frac{1}{2}$ May 19. | 23                 | 0 12                | 42                         | 23 $\frac{1}{2}$       | 41 58 U.                                 | 53 13 7              | 206 43 $\frac{1}{4}$      | *       | G.     | $\odot$ & $\odot$ .                  |
|                       | 23                 | 10 10               | 43 7                       | 40 10 U.               | 53 10 10                                 | 24 29                | 206 34                    | *       | G.     | $\odot$ & $\odot$ . } Observed       |
|                       | 23                 | 18 42               | 43 42 $\frac{2}{3}$        | 38 31 $\frac{2}{3}$ U. | 53 7 47                                  |                      | 206 11                    | *       | G.     | $\odot$ & $\odot$ . } the Poop.      |
| $\odot$ — 20.         | Noon.              |                     | 45 13 $\frac{1}{2}$        |                        |  | 24 26                | 206 47 $\frac{3}{4}$      | 74      | G.     | $\odot$ 's Merid. Alt. San.          |
| $\odot$ — 21.         | Noon.              |                     | 44 59                      |                        |  | 24 28 $\frac{1}{2}$  | 207 31 $\frac{3}{4}$      | 70      | G.     | Cape S. $\frac{1}{4}$ W. true, 20    |
| $\odot$ — 22.         | Noon.              |                     | 44 56                      |                        |  | 24 19 $\frac{2}{3}$  | 208 7                     | 70      | G.     | $\odot$ 's Meridian Altitude.        |
| $\odot$ — 23.         | Noon.              |                     |                            |                        |  | 24 04                | 208 18                    |         | G.     | Ditto.                               |
| $\odot$ — 24.         | Noon.              |                     | 45 1 $\frac{1}{2}$         |                        |  | 23 51 $\frac{3}{4}$  | 208 33 $\frac{1}{4}$      | 68      | G.     | At anchor in Bustard B.              |
| $\odot$ — 25.         | Noon.              |                     | 45 19                      |                        |  | 23 23 $\frac{2}{3}$  | 209 2 $\frac{1}{4}$       | 70      | G.     | $\odot$ 's Meridian Altitude.        |
| $\odot$ — 26.         | Noon.              |                     | 45 25                      |                        |  | 23 7 $\frac{1}{2}$   | 209 18 $\frac{3}{4}$      |         | G.     | Ditto. Cape Caprice                  |
| $\odot$ — 27.         | Noon.              |                     | 45 29                      |                        |  | 22 53 $\frac{1}{2}$  | 209 15 $\frac{1}{2}$      |         | G.     | S. 60° E. true, dist. 21.            |
| $\odot$ — 28.         | Noon.              |                     | 46 5                       |                        |  | 22 7 $\frac{4}{5}$   | 210 1                     |         | G.     | Ditto.                               |
| $\odot$ — 29.         | Noon.              |                     |                            |                        |  |                      |                           |         | G.     | Ditto. Cape Manifold                 |
|                       | 2 26 9             | 35 14 $\frac{2}{3}$ | 39 19 $\frac{2}{3}$ U.     | 70 28 35               |  | 210 23 $\frac{1}{4}$ |                           |         | G.     | N. W. true, dist. 10 n.              |
|                       | 2 32 23            | 34 18               | 40 29 U.                   | 70 31 50               |  | 210 55 $\frac{3}{4}$ |                           |         | G.     | $\odot$ 's Mer. Alt. Atanch.         |
|                       | 2 38 21            | 33 2 $\frac{2}{3}$  | 41 34 $\frac{1}{2}$ U.     | 70 34 30               |  | 211 19 $\frac{1}{2}$ |                           |         | G.     | Cape Townshend S.                    |
| $\odot$ — 30.         | Noon.              |                     |                            |                        |  | 22 5 $\frac{1}{2}$   | 210 23 $\frac{1}{4}$      |         | G.     | E. distant 13 miles                  |
| $\odot$ — 31.         | Noon.              |                     | 45 53                      |                        |  | 21 53 $\frac{1}{2}$  | 210 30 $\frac{3}{4}$      | 73      | G.     | $\odot$ and $\odot$ . } Observed     |
| $\odot$ June 1.       | Noon.              |                     | 46 9                       |                        |  | 21 29 $\frac{1}{2}$  | 210 46 $\frac{1}{4}$      | 70      | G.     | $\odot$ and $\odot$ . } the Force    |
| $\odot$ — 2.          | Noon.              |                     | 46 35                      |                        |  | 20 55 $\frac{2}{3}$  | 211 10 $\frac{3}{4}$      | 70      | G.     | $\odot$ and $\odot$ . } in Thru      |
| $\odot$ — 3.          | Noon.              |                     | 46 57                      |                        |  | 20 26 $\frac{2}{3}$  | 211 25                    | 70      | G.     | $\odot$ and $\odot$ . } Sound.       |
| $\odot$ — 4.          | Noon.              |                     | 47 29                      |                        |  | 19 47 $\frac{1}{2}$  | 212 13 $\frac{3}{4}$      | 75      | G.     | Latit. obs.                          |
| $\odot$ — 5.          | Noon.              |                     | 47 58                      |                        |  | 19 12                | 212 51 $\frac{3}{4}$      | 78      | G.     | $\odot$ 's Mer Alt. Pier H.          |
| $\odot$ — 6.          | Noon.              |                     | 47 4 $\frac{1}{2}$         |                        |  | 18 59 $\frac{1}{2}$  | 213 16 $\frac{1}{2}$      | 76      | G.     | S. 36° W. true, dist. 4              |
| $\odot$ — 7.          | Noon.              |                     | 48 9                       |                        |  | 18 49 $\frac{1}{2}$  | 213 37 $\frac{3}{4}$      | 76      | G.     | Cape Palmerston W.                   |
| $\odot$ — 8.          | Noon.              |                     | 48 54                      |                        |  | 17 59                | 213 56 $\frac{3}{4}$      | 76      | G.     | N. true, 3 leagues.                  |
| $\odot$ — 9.          | Noon.              |                     | 49 54 $\frac{1}{2}$        |                        |  | 16 53 $\frac{1}{2}$  | 214 8                     | 76      | G.     | Cape Hillsborough W.                 |
| $\odot$ — 10.         | Noon.              |                     | 50 23                      |                        |  | 16 20 $\frac{1}{2}$  | 214 28 $\frac{1}{4}$      | 75      | G.     | $\frac{1}{2}$ N. true, 7 miles.      |
| $\odot$ — 11.         | Noon.              |                     | 50 54                      |                        |  | 15 45 $\frac{2}{3}$  | 214 24 $\frac{1}{2}$      | 75      | G.     | Cape Conway S. 19° W.                |
| $\odot$ — 12.         | Noon.              |                     |                            |                        |  | 15 46                | 214 24                    | 78      | G.     | true, distant 4 mile.                |
|                       | 20 55 20           | 31 15               | 18 16 $\frac{2}{3}$ U.     | 118 49 50              |  | 213 56               |                           | *       | G.     | Cape Gloucester S. 6                 |
|                       | 20 59 33           | 32 0 $\frac{2}{3}$  | 17 14 $\frac{2}{3}$ U.     | 118 47 20              |  | 214 15               |                           | *       | G.     | E. true, dist. 7 $\frac{1}{2}$ leag. |
|                       | 21 3 32            | 32 43 $\frac{1}{2}$ | 16 17 U.                   | 118 45 30              |  | 214 18               |                           | *       | G.     | Cape Upstart S. 38 $\frac{1}{2}$ °   |
|                       |                    |                     |                            |                        |  |                      |                           |         | G.     | distant 12 leagues.                  |
|                       |                    |                     |                            |                        |  |                      |                           |         | G.     | Cape Cleveland S. 11° E.             |
|                       |                    |                     |                            |                        |  |                      |                           |         | G.     | Magnetical Isle S. W.                |
|                       |                    |                     |                            |                        |  |                      |                           |         | G.     | $\odot$ 's Meridian Altitude.        |
|                       |                    |                     |                            |                        |  |                      |                           |         | G.     | Cape Sandwich S. by                  |
|                       |                    |                     |                            |                        |  |                      |                           |         | G.     | $\frac{1}{2}$ E. true, 19 miles.     |
|                       |                    |                     |                            |                        |  |                      |                           |         | G.     | Off Cape Grafton.                    |
|                       |                    |                     |                            |                        |  |                      |                           |         | G.     | Off Trinity Bay.                     |
|                       |                    |                     |                            |                        |  |                      |                           |         | G.     | Ship aground on a led                |
|                       |                    |                     |                            |                        |  |                      |                           |         | G.     | of rocks.                            |
|                       |                    |                     |                            |                        |  |                      |                           |         | G.     | About $1\frac{1}{2}$ mile S. E. of   |
|                       |                    |                     |                            |                        |  |                      |                           |         | G.     | Rocks.                               |
|                       |                    |                     |                            |                        |  |                      |                           |         | G.     | $\odot$ & $\odot$ . } A little incl  |
|                       |                    |                     |                            |                        |  |                      |                           |         | G.     | $\odot$ & $\odot$ . } Close und      |
|                       |                    |                     |                            |                        |  |                      |                           |         | G.     | $\odot$ & $\odot$ . } Hope Islan     |
|                       |                    |                     |                            |                        |  |                      |                           |         | G.     | $\odot$ & $\odot$ . } Obs. on Q.     |

# ASTRONOMICAL OBSERVATIONS.

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| 1770.    | Time by the Watch.                               | Alt. ☉'s L.L. or *  | Moon's Altitude.   | Diff. ☉'s L. from ☉ or *. | Ship's Latit. S.    | Long. W. of Greenwich. | Thermo. | Observ. | PHENOMENA AND REMARKS.   |
|----------|--|---------------------|--|---------------------------|---------------------|------------------------|---------|---------|--|
|          | H ' "  | ° ' "               | ° ' "  | ° ' "                     | ° ' "               | ° ' "                  |         |         |  |
| June 13. | Noon.  | 50 55               |  |                           | 15 37 $\frac{2}{3}$ | 214 40                 | 77      | G.      | ☉'s Meridian Altitude.   |
| 14.      | Noon.  | 51 4                |  |                           | 15 25 $\frac{1}{2}$ | 214 48 $\frac{1}{2}$   | 76      | G.      | Ditto.   |
| 15.      | Noon.  |                     |  |                           |                     |                        |         |         |  |
| 16.      | Noon.  |                     |  |                           |                     |                        |         |         |  |
| 17.      | Noon.  |                     |  |                           |                     |                        |         |         |  |
| 18.      | Noon.  |                     |  |                           |                     |                        |         |         |  |
| 19.      | Noon.  |                     |  |                           |                     |                        |         |         |  |
| 20.      | Noon.  | 50 54               |  |                           | 15 27 $\frac{1}{4}$ |                        | 79      |         |  |
| 21.      | Noon.  |                     |  |                           |                     |                        | 80      | G.      | ☉'s Meridian Altit.  |
| 22.      | Noon.  | 50 55               |  |                           | 15 26 $\frac{1}{2}$ | 214 52                 | 82      |         |  |
| 23.      | Noon.  |                     |  |                           |                     |                        | 76      | G.      | ☉'s Meridian Altit.  |
| 24.      | Noon.  | 50 54               | The Eye 3 f. above the water.  |                           | 15 27 $\frac{1}{5}$ |                        | 83      | G.      | ☉'s Meridian Altit.  |
| 25.      | Noon.  |                     |  |                           |                     |                        |         |         |  |
| 26.      | Noon.  | 50 57               | High water at 12 o'clock.  |                           | 15 27               | Height of the Eye 3 f. | 86      | G.      | ☉'s Meridian Altit.  |
| 27.      | Noon.  |                     |  |                           |                     |                        |         |         |  |
| 28.      | Noon.  | 51 2                | The Eye 3 f. above the water.  |                           | 15 27 $\frac{1}{2}$ |                        | 83      | G.      | ☉'s Meridian Altit.  |
|          | 5 0 28   | 7 42 $\frac{5}{6}$  | Apparent Time 4 <sup>h</sup> 56' 40".  |                           |                     |                        |         | G.      | ☉'s L.L. The Eye 3 feet above the water.                         |
|          | 15 1 31  |                     | ☉'s first Satellite emerged. Appa. Time 14 <sup>h</sup> 58' 49".               |                           |                     | 214 43 $\frac{3}{4}$   |         |         | Mr. Green.   |
|          | 15 2 0   |                     | Ditto. 14 <sup>h</sup> 59' 18".  |                           |                     | 214 36 $\frac{1}{2}$   |         |         | Captain Cook.  |
|          | 19 58 30   | 18 48 $\frac{2}{3}$ | Height of the Eye 5 $\frac{1}{2}$ feet. Apparent Time 19 <sup>h</sup> 56' 20". |                           |                     |                        |         | G.      | ☉'s L.L. by Capt. Cook.  |
| 29.      | Noon.  |                     |  |                           |                     |                        |         |         |  |
| 30.      | Noon.  |                     |  |                           |                     |                        |         |         |  |
| July 1.  | Noon.  | 51 13               | The Eye 3 f. above the water.  |                           | 15 27 $\frac{2}{3}$ |                        |         | G.      | ☉'s Meridian Altit.  |
| 15.      | 22 48 42   | 50 18               | 16 20 $\frac{1}{2}$ U.   | 76 37 40                  |                     | 213 34                 | *       | G.      | The observations tant.<br>Dip for ☉ 1' 39".<br>Dip for ☉ 4' 30". |
|          | 22 56 42   | 51 4                | 14 35 $\frac{2}{3}$ U.   | 76 34 00                  |                     | 213 19                 | *       | G.      |  |
|          | 23 3 37  | 51 28 $\frac{1}{2}$ | 13 4 $\frac{2}{3}$ U.  | 76 30 55                  |                     | 213 32                 | *       | G.      |  |
| 16.      | 7 26 0   |                     | ☉'s first Satellite emerged. Appa. Time 7 <sup>h</sup> 39' 51".                |                           |                     | 215 42 $\frac{1}{2}$   | *       |         | Mr. Green.   |
|          | 7 27 40  |                     | Ditto. 7 <sup>h</sup> 41' 31".   |                           |                     | 215 17 $\frac{1}{2}$   | *       |         | Captain Cook.  |
|          | 22 38 2  | 49 49 $\frac{2}{3}$ | 27 43 $\frac{2}{3}$ U.   | 63 45 0                   |                     | 214 33 $\frac{1}{2}$   | *       | G.      | Very clear and distinct. The Dip as yesterday.                   |
|          | 22 46 21   | 50 34 $\frac{1}{2}$ | 26 6 $\frac{1}{2}$ U.  | 63 41 50                  |                     | 214 32 $\frac{1}{2}$   | *       | G.      |  |
|          | 22 54 26   | 51 16               | 24 28 U.   | 63 37 55                  |                     | 214 46 $\frac{1}{2}$   | *       | G.      |  |
| 26.      | 3 52 12  | 25 27               | 80 27 $\frac{1}{2}$ U.   | 62 20 40                  |                     | 214 53 $\frac{1}{4}$   | *       | G.      | Very clear and distinct. Dip for ☉ 4' 22".<br>Dip for ☉ 2' 20".  |
|          | 4 0 38   | 23 40               | 81 41 $\frac{1}{2}$ U.   | 62 23 50                  |                     | 215 13 $\frac{3}{4}$   | *       | G.      |  |
|          | 4 5 38   | 22 36               | 82 21 $\frac{1}{2}$ U.   | 62 25 15                  |                     | 215 13 $\frac{1}{2}$   | *       | G.      |  |
| 30.      | High water at 5 <sup>h</sup> 45'. Apparent Time. |                     |  |                           |                     |                        |         |         |  |

In Endeavour River.

In Endeavour River.

\* Mr. Green remarks that, "In his opinion, Captain Cook's Telescope was not well adjusted to his eye; because on looking through it at Jupiter, after the observation, both Jupiter and the Satellites appeared indistinct to him; and the same focal distance used to suit both their eyes."

## ASTRONOMICAL OBSERVATIONS.

| 1770.      | Time by the Watch. | Alt. ☉'s L.L. or * | Moon's Altitude. | Dist. ☉'s L. from ☉ or * | Ship's Latit. S. | Long. W. of Greenwich. | Thermo. | Observ. | PHENOMENA AND REMARKS.  |
|------------|--------------------|--------------------|------------------|--------------------------|------------------|------------------------|---------|---------|---|
|            | H / "              | ° / '              | ° / '            | ° / ' "                  | ° / '            | ° / '                  |         |         |   |
| ♂ July 31. | Noon.              |                    |                  |                          |                  |                        | 75      |         |   |
| ♀ Aug. 1.  | Noon.              |                    |                  |                          |                  |                        | 80      |         | In Endeavour River.   |
| ♂ — 2.     | Noon.              |                    |                  |                          |                  |                        | 77      |         |   |
| ♀ — 3.     | Noon.              |                    |                  |                          |                  |                        | 77      |         |   |
| ♂ — 4.     | Noon.              | 57 22½             |                  |                          | 15 24            | 214 37½                | 73      | G.      | ☉'s Merid. Altit. Q.D.  |
| ☉ — 5.     | Noon.              | 57 39½             |                  |                          | 15 23½           | 214 37½                | 74      | G.      | Ditto. Q.D.   |
| ♂ — 6.     | Noon.              | 58 2               |                  |                          | 15 17½           | 214 29½                | 70      |         | Ditto. Quarter Deck. At anchor. Cape Point W. by N. ½ N. distant 5 leagues. |
| ♂ — 7.     | Noon.              |                    |                  |                          |                  |                        | 73      |         |   |
| ♀ — 8.     | Noon.              |                    |                  |                          | 15 10            | 214 33                 | 72      |         | Latit. observed. At anchor. Cape Point S. W. distant 3 leagues.             |
| ♂ — 9.     | Noon.              |                    |                  |                          |                  |                        | 74      |         |   |
| ♀ — 10.    | Noon.              | 59 37              |                  |                          | 14 51½           | 214 32                 | 75      | G.      | ☉'s Mer. Alt. Q.D. Flattery S. S. W. distant 2 leagues.                     |
| ♂ — 11.    | Noon.              |                    |                  |                          |                  |                        | 75      |         | ☉'s Meridian Altitude. Quarter Deck. At anchor under Point Look-out.        |
| ☉ — 12.    | Noon.              | 60 16              |                  |                          | 14 8½            | 214 36                 | 74      | G.      |   |
| ♂ — 13.    | Noon.              | 60 45              |                  |                          | 14 37½           | 214 19½                | 76      | G.      | Ditto. Quarter Deck. Lizard Ile E. S. E. distant 1 mile.                    |
|            | 22 3 38            | 49 39              | 24 6 U.          | 81 28 10                 |                  | 213 59                 | *       | G.      | ☉ & ☉. { Troubleless observing.   |
|            | 22 12 23           | 51 11½             | 22 17½ U.        | 81 25 0                  | 13 53            | 213 47½                | *       | G.      | ☉ & ☉. { account of the rigging. Forc.                                      |
|            | 22 18 58           | 52 19½             | 20 54 U.         | 81 21 15                 |                  | 214 12½                | *       | G.      |   |
| ♂ — 14.    | Noon.              | 61 55              |                  |                          | 13 6½            | 214 29½                | 78      | G.      | ☉'s Merid. Altit. Q.D.  |
|            | 22 13 0            | 51 46              | 34 0½ U.         | 68 16 0                  |                  | 214 58½                | *       | G.      | ☉ & ☉. { Very good. served on N.I.P.  |
|            | 22 18 41           | 52 47½             | 32 54½ U.        | 68 13 40                 | 13 2½            | 215 1                  | *       | G.      |   |
|            | 22 23 39           | 53 38½             | 32 2½ U.         | 68 12 0                  |                  | 214 53½                | *       | G.      | ☉ & ☉. {  |
| ♀ — 15.    | Noon.              | 62 58              |                  |                          | 13 2¼            | 215 38                 | 79      | G.      | ☉'s Merid. Altit. Q.D.  |
|            | 21 46 37           | 46 42              | 48 36½ U.        | 54 53 45                 |                  | 215 58½                | *       | G.      | ☉ & ☉. { Very good. Provident Channel. the Forec.                           |
|            | 21 51 33           | 47 37½             | 47 56 U.         | 54 52 40                 | 12 36½           | 215 46½                | *       | G.      |   |
|            | 21 57 37           | 48 38              | 47 14½ U.        | 54 51 35                 |                  | 215 28¾                | *       | G.      |   |
| ♂ — 16.    | Noon.              | 63 43              |                  |                          | 12 36½           | 215 59½                | 76      | G.      | ☉'s Merid. Altit. Q.D.  |
| ♀ — 17.    | Noon.              | 64 1               |                  |                          | 12 37½           | 216 16¾                | 77      | G.      | Ditto. { At anchor, in Provident Channel.                                   |
| ♂ — 18.    | Noon.              | 64 30              |                  |                          | 12 28            | 216 31¼                | 80      | G.      | Ditto. Quarter Deck.  |
| ☉ — 19.    | Noon.              | 64 17              |                  |                          | 12 0¾            | 216 51¼                | 80      | G.      | Ditto. Forecaille.  |



## ASTRONOMICAL OBSERVATIONS.

| 1770.     | Time by the Watch.  | Alt. ☉'s L.L. or *  | Moon's Altitude.       | Dist. ☉'s L. from ☉ or *. | Ship's Latit. S.    | Long. W. of Greenwich. | Thermo. | Observ. | PHENOMENA AND REMARKS.   |
|-----------|---|---------------------|------------------------|---------------------------|---------------------|------------------------|---------|---------|--|
| Sept. 10. | Noon.   | 75 12               |                        |                           | 10 00               | 233 15                 |         | G.      | Observed on the Q. Deck.   |
|           | The Latitude observed was 15 miles more than the Latitude by account. Timor N. W. |                     |                        |                           |                     |                        |         |         |  |
|           | 21 10 3   | 44 46 $\frac{2}{3}$ | 25 31 $\frac{2}{3}$ U. | 98 5 40                   |                     | 233 8 $\frac{1}{2}$    | *       | G.      | <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> ☉ &amp; ☉.<br/>☉ &amp; ☉.<br/>☉ &amp; ☉. </div> <div> The Moon rather faint, but the observation good. The Island of Timor from N. N. E. to W. S. E. true. Q. D. </div> </div> |
|           | 21 16 15  | 46 15 $\frac{1}{3}$ | 24 17 $\frac{2}{3}$ U. | 98 3 10                   | 9 41                | 233 7                  | *       | G.      |  |
|           | 21 21 40  | 47 32               | 23 5 U.                | 98 1 0                    |                     | 233 14                 | *       | G.      |  |
| 11.       | Noon.   | 75 59               |                        |                           | 9 35 $\frac{1}{2}$  | 233 42                 | 81      | G.      | Observed on the Q. Deck.   |
|           | 21 23 22  | 50 51 $\frac{1}{3}$ | 32 21 $\frac{2}{3}$ U. | 84 55 20                  |                     | 232 40                 | *       | G.      | <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> ☉ &amp; ☉.<br/>☉ &amp; ☉.<br/>☉ &amp; ☉. </div> <div> Very good. The Island of Timor N. 42° E. to S. 59° W. Off shore 6 leagues. Q. D. </div> </div>                           |
|           | 21 29 12  | 52 14               | 31 11 U.               | 84 52 37                  | 9 35 $\frac{2}{3}$  | 232 51                 | *       | G.      |  |
|           | 21 35 3   | 53 36 $\frac{1}{3}$ | 30 0 U.                | 84 50 50                  |                     | 232 36                 | *       | G.      |  |
| 12.       | Noon.   | 76 22               |                        |                           | 9 35 $\frac{1}{2}$  | 233 54                 | 81      | G.      | Observed on the Q. Deck.   |
| 13.       | Noon.   | 76 36               |                        |                           | 9 45                | 234 1 $\frac{1}{2}$    | 83      |         | Observed on the Q. D. Timor from N. 31° E. to S. 73° W. true, distant 6 or 7 leagues.  |
| 14.       | Noon.   |                     |                        |                           | 9 54 $\frac{1}{2}$  | 234 25 $\frac{1}{2}$   | 84      |         | Lat. obser. Timor N. 11° E. to S. 78° W. dist. 7 lea.  |
| 15.       | Noon.   |                     |                        |                           | 10 1                | 235 1 $\frac{1}{2}$    | 85      |         | Latit. obser. South end of Timor S. W. by W. true, distant 4 leagues.  |
| 16.       | Noon.   |                     |                        |                           | 10 23 $\frac{1}{2}$ | 235 49 $\frac{1}{2}$   | 83      |         | Lat. obser. South end of Timor N. N. W. true, dist. 5 or 6 leagues, and the Island of Rotte from S. 75° W. to N. 67° W. and Semau N. W.  |
| 17.       | Noon.   |                     |                        |                           | 10 27               | 237 24                 | 85      |         | Latitude observed. Off the north side of Savu.   |
| 18.       | Noon.   |                     |                        |                           |                     |                        | 81      |         |  |
| 19.       | Noon.   |                     |                        |                           |                     |                        | 82      |         | At anchor in Seba Bay, in the Island of Savu.  |
| 20.       | Noon.   |                     |                        |                           |                     |                        | 84      |         |  |
| 21.       | Noon.   |                     |                        |                           | 10 33               | 237 28                 | 85      |         | Latitude observed.   |

\* In Captain Cook's Journal, the *Latitude observed* is said to be 10° 39' S. but all the other Journals have 10° 23' S. It is necessary to take notice of this circumstance, because the latitude of the south end of Timor, inserted at page 667, vol. III. of Dr. Hawkesworth's account of this voyage, is manifestly deduced by Captain Cook, from this observation, and the bearing and distance of it from the ship when the observation was taken. I prefer the latitude given in the other journals, because the latitude of the south point of Timor, deduced from it by means of the bearing and distance, agrees with that deduced in the same manner, from the latitude observed on the 15th, which will not be the case if Captain Cook's latitude of this day be adopted. Mr. Green was, at this time, become too ill to observe often, and no other person in the ship ever put down their observations, but contented themselves with inserting the results, as is done by seamen in general; by which means, if a mistake, like this, happens, it can never be rectified afterwards; a practice which cannot be too frequently, or too severely reprobated.

# ASTRONOMICAL OBSERVATIONS.

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| 1770.   | Time by the Watch. | Alt. $\odot$ 's L.L. or * | Moon's Altitude. | Diff. $\odot$ 's L. from $\odot$ or *. | Ship's Latit. S.    | Long. W. of Greenwich. | Thermo. | Observ. | PHENOMENA AND REMARKS.   |
|---|--------------------|---------------------------|------------------|--|---------------------|------------------------|---------|---------|--|
|   | H ' "              | ° ' "                     | ° ' "            | ° ' "                                  | ° ' "               | ° ' "                  |         |         |  |
| Sept. 22.   | Noon.              |                           |                  |  | 10 9                | 238 50 $\frac{2}{3}$   | 84      |         | Latitude observed.   |
| 23.   | Noon.              |                           |                  |  | 11 10               | 240 33 $\frac{1}{2}$   | 85      |         | Ditto.   |
| 24.   | Noon.              | 79 32                     |                  |  | 11 5 $\frac{1}{2}$  | 242 19 $\frac{1}{4}$   | 84      | G.      | Observed on the Q. Deck.   |
| 25.   | Noon.              | 79 49                     |                  |  | 11 12 $\frac{1}{2}$ | 244 27                 | 81      | G.      | Ditto.   |
| 26.   | Noon.              | 80 15                     |                  |  | 11 10               | 246 29                 | 81      | G.      | Ditto.   |
| 27.   | Noon.              |                           |                  |  | 10 46               | 249 50 $\frac{3}{4}$   | 82      |         | Latitude observed.   |
| 28.   | Noon.              |                           |                  |  | 10 50               | 252 10 $\frac{1}{2}$   | 82      |         | Ditto.   |
| 29.   | Noon.              |                           |                  |  | 9 31                | 254 10 $\frac{1}{2}$   | 84      |         | Ditto.   |
| 30.   | Noon.              |                           |                  |  | 7 34                | 255 14                 | 85      |         | Ditto.   |
| Octo. 1.  | Noon.              |                           |                  |  | 6 29                |                        | 85      |         | Latit. obs. Cracatoa N. 40° E. true, dist. 7 leag. and Prince's Island from S. 35° E. to S. by E. distant about 3 leagues.                 |
| 2.  | Noon.              |                           |                  |  |                     |                        | 86      |         |  |
| 3.  | Noon.              |                           |                  |  |                     |                        | 85      |         |  |
| 4.  | Noon.              |                           |                  |  | 5 55                |                        | 84      |         | Latit. obs. Pulo Moroc S. E. by S. dist. 1 $\frac{1}{2}$ mile.   |
| 5.  | Noon.              |                           |                  |  | 5 53                |                        | 86      |         | Lat. obs. Pulo Baba and Bantam Point in one, bearing E. by N. the Point distant 1 $\frac{1}{2}$ mile.                                      |
| No Observations were made, nor any particular account kept from this time until after they left Batavia; before which place they anchored on the 10th of October, according to their account; but on the 11th by the account of the Dutch, at that place. They lay at Batavia, repairing the ship, until the 26th of December, on which Day they weighed and failed; and on |                    |                           |                  |  |                     |                        |         |         |  |
| 1771.   |                    |                           |                  |  |                     | East Long.             |         |         |  |
| Jan. 16.  | Noon.              |                           |                  |  | 6 45                | 104 42                 |         |         | Lat. obs. Java Head * S. E. by S. true, dist. 6 m.   |
| 17.   | Noon.              |                           |                  |  | 7 32                | 104 22                 |         |         | Latitude observed.   |
| 18.   | Noon.              |                           |                  |  | 7 55                | 104 0                  |         |         | Ditto.   |
| 19.   | Noon.              |                           |                  |  | 8 48                | 104 0                  |         |         | Ditto.   |
| 20.   | Noon.              |                           |                  |  | 9 14                | 103 33                 |         |         | Ditto.   |
| 21.   | Noon.              |                           |                  |  | 9 46                | 102 40                 |         |         | Ditto.   |
| 22.   | Noon.              |                           |                  |  | 9 29                | 102 34                 |         |         | Ditto.   |
| 23.   | Noon.              |                           |                  |  | 9 30                | 102 49                 |         |         | Ditto.   |
| 24.   | Noon.              |                           |                  |  | 9 34                | 102 46                 |         |         | Ditto.   |
| 25.   | Noon.              |                           |                  |  | 9 44                | 102 49                 |         |         | Ditto.   |
| 26.   | Noon.              |                           |                  |  | 9 56                | 102 58                 |         |         | Ditto.   |
| 27.   | Noon.              |                           |                  |  | 10 12               | 102 46                 |         |         | Ditto.   |
| 28.   | Noon.              |                           |                  |  | 11 0                | 101 57                 |         |         | Mr. Green died; and from this time the observations were made by Mr. Charles Clerke, (since Captain) who was Master's Mate in this voyage. |
| 29.   | Noon.              |                           |                  |  | 11 57               | 101 6                  |         |         |  |
| 30.   | Noon.              |                           |                  |  | 12 48               | 100 19                 |         |         |  |
| 31.   | Noon.              |                           |                  |  | 13 42               | 99 17                  |         |         |  |
| Feb. 1.   | Noon.              |                           |                  |  | 14 44               | 97 26                  |         |         |  |

\* Captain Cook says, that Java Head is in latitude 6° 49' S. and longitude 104° 48' E. and that this situation of it is deduced by means of the maps of these parts, from Astronomical Observations made by the Reverend Mr. Mohr, at Batavia.



## ASTRONOMICAL OBSERVATIONS.

| 1771.          | Time by the Watch. | Alt. $\odot$ 's L.L. or * | Moon's Altitude.       | Dist. $\odot$ 's L. from $\odot$ or *. | Ship's Latit. S. | Long. E. of Greenwich. | Thermo. | Obser. | PHENOMENA AND REMARKS.                 |
|----------------|--------------------|---------------------------|------------------------|--|------------------|------------------------|---------|--------|--|
| H              | "                  | "                         | "                      | "                                      | "                | "                      | "       | "      | "                                      |
| Feb. 2.        | Noon.              |                           |                        |  | 15 48            | 94 39                  |         |        | Latitude observed.                     |
| $\odot$ — 3.   | Noon.              |                           |                        |  | 16 40            | 92 28                  |         |        | Ditto.                                 |
| $\vee$ — 4.    | Noon.              |                           |                        |  | 17 30            | 90 1                   |         |        | Ditto.                                 |
| $\delta$ — 5.  | Noon.              |                           |                        |  | 18 6             | 87 28                  |         |        | Ditto.                                 |
| $\delta$ — 6.  | Noon.              |                           |                        |  | 18 30            | 85 43                  |         |        | Ditto.                                 |
|                | 20 31 25           | 40 1 $\frac{2}{3}$        | 55 31 U.               | 83 40 25                               |                  | 84 24 $\frac{1}{2}$    |         | Cl.    | $\vee$ & $\odot$ . } The air perfect-  |
|                | 20 36 24           | 41 15 $\frac{1}{3}$       | 54 17 U.               | 83 36 40                               |                  | 83 53 $\frac{1}{2}$    |         | Cl.    | $\vee$ & $\odot$ . } ly clear, and     |
|                | 20 38 16           | 42 22                     | 53 14 U.               | 83 36 00                               | 18 54            | 83 33                  |         | Cl.    | $\vee$ & $\odot$ . } the limbs well    |
|                | 20 45 31           | 43 19 $\frac{1}{3}$       | 52 19 $\frac{1}{3}$ U. | 83 34 20                               |                  | 84 6                   |         | Cl.    | $\vee$ & $\odot$ . } defined. Ob-      |
|                | 20 48 18           | 44 2 $\frac{1}{3}$        | 51 42 $\frac{1}{3}$ U. | 83 33 5                                |                  | 83 48                  |         | Cl.    | $\vee$ & $\odot$ . } served on the     |
| 24 — 7.        | Noon.              |                           |                        |  | 18 58            | 83 41                  |         |        | Latitude observed.                     |
|                | 20 39 31           | 41 54                     | 65 30 U.               | 71 56 40                               |                  | 81 39 $\frac{1}{2}$    |         | Cl.    | $\vee$ & $\odot$ . }                   |
|                | 20 43 28           | 42 50 $\frac{2}{3}$       | 64 36 $\frac{2}{3}$ U. | 71 54 50                               |                  | 81 29 $\frac{3}{4}$    |         | Cl.    | $\vee$ & $\odot$ . } Very good.        |
|                | 20 47 0            | 43 39 $\frac{2}{3}$       | 63 47 $\frac{2}{3}$ U. | 71 53 15                               | 19 17            | 81 15 $\frac{3}{4}$    |         | Cl.    | $\vee$ & $\odot$ . } Observed on       |
|                | 20 52 0            | 44 50 $\frac{1}{3}$       | 62 49 $\frac{2}{3}$ U. | 71 52 40                               |                  | 81 38 $\frac{1}{4}$    |         | Cl.    | $\vee$ & $\odot$ . } the Poop.         |
|                | 20 55 55           | 45 47                     | 61 50 $\frac{2}{3}$ U. | 71 50 40                               |                  | 81 18 $\frac{1}{5}$    |         | Cl.    | $\vee$ & $\odot$ . }                   |
| $\delta$ — 8.  | Noon.              |                           |                        |  | 19 24            | 81 10                  |         |        | Latitude observed.                     |
| $\vee$ — 9.    | Noon.              |                           |                        |  | 19 58            | 78 58                  |         |        | Ditto.                                 |
| $\odot$ — 10.  | Noon.              |                           |                        |  | 20 28            | 76 34                  |         |        | Ditto.                                 |
| $\vee$ — 11.   | Noon.              |                           |                        |  | 20 58            | 74 22                  |         |        | Ditto.                                 |
| $\delta$ — 12. | Noon.              |                           |                        |  | 21 25            | 72 58                  |         |        | Ditto.                                 |
| $\delta$ — 13. | Noon.              |                           |                        |  | 21 51            | 71 25                  |         |        | Ditto.                                 |
| 24 — 14.       | Noon.              |                           |                        |  | 22 21            | 69 35                  |         |        | Ditto.                                 |
| $\delta$ — 15. | Noon.              |                           |                        |  | 22 40            | 67 21                  |         |        | Ditto.                                 |
| $\vee$ — 16.   | Noon.              |                           |                        |  | 22 52            | 65 14                  |         |        | Latitude by account.                   |
| $\odot$ — 17.  | Noon.              |                           |                        |  | 23 20            | 62 24                  |         |        | Ditto.                                 |
| $\vee$ — 18.   | Noon.              |                           |                        |  | 23 57            | 59 44                  |         |        | Latitude observed.                     |
| $\delta$ — 19. | Noon.              |                           |                        |  | 24 26            | 57 23                  |         |        | Ditto.                                 |
| $\delta$ — 20. | Noon.              |                           |                        |  | 24 57            | 55 5                   |         |        | Ditto.                                 |
|                | 2 25 37            | 52 35 $\frac{1}{2}$       | 43 52 $\frac{1}{2}$ U. | 64 2 20                                |                  | 55 32 $\frac{1}{4}$    |         | Cl.    | $\vee$ & $\odot$ . } Clear air and     |
|                | 2 35 17            | 50 28                     | 44 52 $\frac{1}{2}$ U. | 64 5 40                                | 25 00            | 55 23 $\frac{1}{2}$    |         | Cl.    | $\vee$ & $\odot$ . } fine weather.     |
|                | 2 41 36            | 49 18 $\frac{2}{3}$       | 45 27 $\frac{2}{3}$ U. | 64 7 40                                |                  | 55 26                  |         | Cl.    | $\vee$ & $\odot$ . } Obs. on the P.    |
| 24 — 21.       | Noon.              |                           |                        |  | 25 21            | 52 45                  |         |        | Latitude observed.                     |
|                | 3 22 15            | 39 48 $\frac{2}{3}$       | 41 20 $\frac{1}{2}$ U. | 76 22 10                               |                  | 53 8                   |         | Cl.    | $\vee$ & $\odot$ . }                   |
|                | 3 29 17            | 38 13                     | 42 4 $\frac{2}{3}$ U.  | 76 24 30                               | 25 31            | 53 1 $\frac{3}{4}$     |         | Cl.    | $\vee$ & $\odot$ . } Very good. On     |
|                | 3 33 25            | 36 58 $\frac{2}{3}$       | 42 33 $\frac{2}{3}$ U. | 76 27 0                                |                  | 52 59 $\frac{2}{3}$    |         | Cl.    | $\vee$ & $\odot$ . } the Poop.         |
| $\delta$ — 22. | Noon.              |                           |                        |  | 26 5             | 50 23                  |         |        | Latitude observed.                     |
|                | 3 48 37            | 33 38                     | 36 33 $\frac{1}{2}$ U. | 88 54 20                               |                  | 50 25 $\frac{1}{2}$    |         | Cl.    | $\vee$ & $\odot$ . } Fine weather      |
|                | 3 54 36            | 32 18 $\frac{2}{3}$       | 37 14 $\frac{1}{2}$ U. | 88 56 20                               | 26 25            | 50 27 $\frac{3}{4}$    |         | Cl.    | $\vee$ & $\odot$ . } the objects dif-  |
|                | 3 59 10            | 31 9 $\frac{1}{2}$        | 37 46 $\frac{1}{2}$ U. | 88 59 20                               |                  | 50 22 $\frac{1}{4}$    |         | Cl.    | $\vee$ & $\odot$ . } ficult. On the P. |
| 24 — 23.       | Noon.              |                           |                        |  | 26 59            | 48 14                  |         |        | Latitude observed.                     |
|                | 3 5 12             | 42 56 $\frac{2}{3}$       | 20 13 $\frac{1}{2}$ U. | 101 22 20                              |                  | 47 58 $\frac{3}{4}$    |         | Cl.    | $\vee$ & $\odot$ . } Smooth sea and    |
|                | 3 10 39            | 45 45 $\frac{1}{3}$       | 21 10 U.               | 101 24 20                              | 27 6             | 47 55 $\frac{3}{4}$    |         | Cl.    | $\vee$ & $\odot$ . } clear air. Obs.   |
|                | 3 15 50            | 40 58                     | 21 45 U.               | 101 25 20                              |                  | 47 50 $\frac{1}{2}$    |         | Cl.    | $\vee$ & $\odot$ . } on the Poop.      |
| $\odot$ — 24.  | Noon.              |                           |                        |  | 27 45            | 46 11                  |         |        | Latitude observed.                     |

# ASTRONOMICAL OBSERVATIONS.

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| 1771.      | Time by the Watch. | Alt. Q's L.L. or *                | Moon's Altitude.                     | Dist. S's L. from S or *. | Ship's Latit. S. | Long. E. of Greenwich.            | Thermo. | Observ. | PHENOMENA AND REMARKS.   |
|------------|--------------------|-----------------------------------|--------------------------------------|---------------------------|------------------|-----------------------------------|---------|---------|--|
|            | H ' "              | ° ' "                             | ° ' "                                | ° ' "                     | ° ' "            | ° ' "                             |         |         |  |
| ☉ Feb. 24. | 4 34 3             | 23 9 <sup>1</sup> / <sub>2</sub>  | 24 49 U.                             | 115 5 20                  |                  | 45 3 <sup>1</sup> / <sub>4</sub>  |         | Cl.     | D & O. } Fine clear weather. Obs. on the Poop.   |
|            | 4 38 48            | 22 6                              | 25 35 <sup>1</sup> / <sub>2</sub> U. | 115 6 40                  | 27 55            | 45 12 <sup>1</sup> / <sub>4</sub> |         | Cl.     |  |
|            | 4 43 10            | 20 49 <sup>2</sup> / <sub>3</sub> | 26 26 <sup>1</sup> / <sub>2</sub> U. | 115 9 0                   |                  | 45 10                             |         | Cl.     |  |
| ☾ — 25.    | Noon.              |                                   |                                      |                           | 28 49            | 44 10                             |         |         | Latitude observed.   |
| ☽ — 26.    | Noon.              |                                   |                                      |                           | 29 6             | 41 50                             |         |         | Ditto.   |
| ☿ — 27.    | Noon.              |                                   |                                      |                           | 29 30            | 39 47                             |         |         | Latitude by account.   |
| ♄ — 28.    | Noon.              |                                   |                                      |                           | 29 37            | 38 1                              |         |         | Ditto.   |
| ♀ Mar. 1.  | Noon.              |                                   |                                      |                           | 29 41            | 36 30                             |         |         | Ditto.   |
| ♂ — 2.     | Noon.              |                                   |                                      |                           | 30 21            | 34 56                             |         |         | Ditto.   |
| ☉ — 3.     | Noon.              |                                   |                                      |                           | 31 1             | 33 22                             |         |         | Latitude observed.   |
| ☾ — 4.     | Noon.              |                                   |                                      |                           | 31 34            | 31 26                             |         |         | Ditto.   |
| ☽ — 5.     | Noon.              |                                   |                                      |                           | 31 7             | 30 6                              |         |         | Latitude by account.   |
| ☿ — 6.     | Noon.              |                                   |                                      |                           | 32 4             | 30 26                             |         |         | Latit. observed; which was 90 miles to the southward of that by account, since the last observation. |
| ♄ — 7.     | Noon.              |                                   |                                      |                           | 32 54            | 28 6                              |         |         | Latitude by account.   |
|            | 19 57 45           | 26 36 <sup>1</sup> / <sub>2</sub> | 59 8 <sup>2</sup> / <sub>3</sub> U.  | 90 7 0                    |                  | 27 36 <sup>1</sup> / <sub>4</sub> |         | Cl.     | D & O. } Observed on the Q. Deck. The Coast of Africa N. 28° W. true, distant 11 or 12 leagues.      |
|            | 20 2 39            | 27 25 <sup>1</sup> / <sub>2</sub> | 58 22 <sup>1</sup> / <sub>2</sub> U. | 90 5 50                   | 34 11            | 27 36 <sup>1</sup> / <sub>4</sub> |         | Cl.     |  |
|            | 20 7 10            | 28 19 <sup>2</sup> / <sub>3</sub> | 57 26 <sup>1</sup> / <sub>2</sub> U. | 90 4 0                    |                  | 27 20 <sup>1</sup> / <sub>2</sub> |         | Cl.     |  |
|            | 21 37 50           | 45 43 <sup>1</sup> / <sub>2</sub> | 39 4 <sup>2</sup> / <sub>3</sub> U.  | 89 34 50                  |                  | 27 51 <sup>1</sup> / <sub>2</sub> |         | Cl.     |  |
|            | 21 41 56           | 46 29 <sup>1</sup> / <sub>2</sub> | 38 7 <sup>1</sup> / <sub>2</sub> U.  | 89 33 20                  | 34 13            | 27 55 <sup>1</sup> / <sub>4</sub> |         | Cl.     |  |
|            | 21 44 36           | 47 22 <sup>1</sup> / <sub>2</sub> | 37 7 U.                              | 89 32 0                   |                  | 28 15                             |         | Cl.     |  |
|            | 22 7 51            | 50 40 <sup>2</sup> / <sub>3</sub> | 33 2 U.                              | 89 23 50                  |                  | 28 4 <sup>1</sup> / <sub>2</sub>  |         | Cl.     |  |
|            | 22 10 20           | 51 52                             | 31 25 <sup>2</sup> / <sub>3</sub> U. | 89 21 30                  | 34 14            | 28 25                             |         | Cl.     |  |
|            | 22 13 40           | 52 53 <sup>1</sup> / <sub>2</sub> | 30 29 <sup>1</sup> / <sub>2</sub> U. | 89 19 20                  |                  | 28 48 <sup>1</sup> / <sub>4</sub> |         | Cl.     |  |
| ♀ — 8.     | Noon.              |                                   |                                      |                           | 34 18            | 27 37                             |         |         | Latit. observed; which was 93 miles to the southward of that by account, since the last observation. |
|            | 22 0 51            | 48 16 <sup>2</sup> / <sub>3</sub> | 44 29 U.                             | 78 2 0                    |                  | 24 24                             |         | Cl.     | D & O. } Observed on the Poop.   |
|            | 22 6 37            | 49 9                              | 43 17 U.                             | 77 59 40                  | 35 40            | 24 13 <sup>1</sup> / <sub>4</sub> |         | Cl.     |  |
|            | 22 12 10           | 50 2 <sup>1</sup> / <sub>2</sub>  | 41 53 <sup>1</sup> / <sub>2</sub> U. | 77 57 0                   |                  | 23 56                             |         | Cl.     |  |
| ♂ — 9.     | Noon.              |                                   |                                      |                           | 35 44            | 24 1                              |         |         | Lat. obs. which was 46 miles to the southward of that by account in the last 24 hours.               |
| ☉ — 10.    | Noon.              |                                   |                                      |                           | 34 52            | 22 40                             |         |         | Latit. observed; which is 14 miles north of that by account.   |
|            | 21 20 39           | 41 22 <sup>2</sup> / <sub>3</sub> | 66 54 <sup>2</sup> / <sub>3</sub> U. | 56 6 50                   |                  | 21 28 <sup>1</sup> / <sub>4</sub> |         | Cl.     | D & O. } Obs. on the Q. Deck. The Observations good.   |
|            | 21 24 47           | 42 20                             | 66 14 <sup>2</sup> / <sub>3</sub> U. | 56 5 20                   | 34 47            | 21 27 <sup>1</sup> / <sub>2</sub> |         | Cl.     |  |
|            | 21 28 30           | 43 18 <sup>2</sup> / <sub>3</sub> | 65 32 <sup>2</sup> / <sub>3</sub> U. | 56 4 0                    |                  | 21 35 <sup>1</sup> / <sub>4</sub> |         | Cl.     |  |
| ☾ — 11.    | Noon.              |                                   |                                      |                           | 34 45            | 21 12                             |         |         | Latitude observed.   |
| ☽ — 12.    | Noon.              |                                   |                                      |                           | 34 58            | 20 30                             |         |         | Lat. observed. Cape La Aguilhas N. E. by N. true, dist. about 4 leagues.                             |

## ASTRONOMICAL OBSERVATIONS.

| 1771.       | Time by the Watch.                               | Alt. ☉'s L.L. or *                 | Moon's Altitude.    | Dist. ☉'s L. from ☉ or *. | Ship's Lat. S.      | Long. E. of Greenwich. | Thermo. | Observ. | PHENOMENA AND REMARKS.  |
|-------------|--|------------------------------------|---------------------|---------------------------|---------------------|------------------------|---------|---------|---|
| H           | "  | °                                  | '                   | "                         | °                   | '                      |         |         |   |
| 8 Mar. 13.  | Noon.  |                                    |                     |                           | 34 15               | 18 13 $\frac{1}{4}$    |         |         | Latit. observed. Cape of Good Hope S. E. true, distant 4 leagues. |
| 24 — 14.    | Anchored in Table Bay, at the Cape of Good Hope. |                                    |                     |                           |                     |                        |         |         |   |
| 8 — 20.     | 2 50 56  | 37 23                              | 38 35               | U. 47 4 20                |                     | 18 25 $\frac{1}{2}$    |         | Cl.     | ☉ & ☉.  |
|             | 2 56 31  | 36 26 $\frac{1}{3}$                | 38 34 $\frac{2}{3}$ | U. 47 5 50                | 33 54 $\frac{1}{2}$ | 19 1 $\frac{1}{2}$     |         | Cl.     | ☉ & ☉.  |
|             | 3 2 3  | 35 26                              | 38 32 $\frac{1}{3}$ | U. 47 7 15                |                     | 18 36 $\frac{3}{4}$    |         | Cl.     | ☉ & ☉.  |
| 24 — 21.    | 2 57 25  | 36 1 $\frac{1}{3}$                 | 35 2                | U. 59 16 50               |                     | 18 19 $\frac{1}{4}$    |         | Cl.     | ☉ & ☉.  |
|             | 3 4 57   | 34 39 $\frac{2}{3}$                | 35 28               | U. 59 18 30               | 33 54 $\frac{1}{2}$ | 18 39 $\frac{1}{2}$    |         | Cl.     | ☉ & ☉.  |
|             | 3 13 33  | 33 4 $\frac{1}{3}$                 | 35 49               | U. 59 21 30               |                     | 18 32                  |         | Cl.     | ☉ & ☉.  |
| 8 — 22.     | 2 57 28  | 35 43                              | 29 55 $\frac{2}{3}$ | U. 71 42 10               |                     | 18 18 $\frac{1}{2}$    |         | Cl.     | ☉ & ☉.  |
|             | 3 4 29   | 34 27 $\frac{1}{3}$                | 30 28 $\frac{2}{3}$ | U. 71 44 50               | 33 54 $\frac{1}{2}$ | 18 11 $\frac{1}{2}$    |         | Cl.     | ☉ & ☉.  |
|             | 3 10 56  | 33 23 $\frac{2}{3}$                | 31 3 $\frac{2}{3}$  | U. 71 47 0                |                     | 18 5 $\frac{1}{4}$     |         | Cl.     | ☉ & ☉.  |
| 12 April 6. | 21 15 52   | 33 34                              | 47 44 $\frac{1}{3}$ | U. 86 39 40               |                     | 18 31                  |         | Cl.     | ☉ & ☉.  |
|             | 21 25 8  | 35 2 $\frac{1}{3}$                 | 45 55 $\frac{1}{3}$ | U. 86 36 20               | 33 54 $\frac{1}{2}$ | 18 19 $\frac{3}{4}$    |         | Cl.     | ☉ & ☉.  |
|             | 21 33 16   | 36 19                              | 44 17               | U. 86 34 40               |                     | 18 54 $\frac{3}{4}$    |         | Cl.     | ☉ & ☉.  |
| ☉ — 7.      | 20 44 32   | 28 0                               | 60 32 $\frac{2}{3}$ | U. 75 48 10               |                     | 19 12 $\frac{1}{2}$    |         | Cl.     | ☉ & ☉.  |
|             | 20 53 56   | 29 38                              | 58 57 $\frac{2}{3}$ | U. 75 44 50               | 33 54 $\frac{1}{2}$ | 18 49 $\frac{1}{4}$    |         | Cl.     | ☉ & ☉.  |
|             | 21 2 27  | 31 5                               | 57 26 $\frac{1}{3}$ | U. 75 42 20               |                     | 18 47 $\frac{1}{4}$    |         | Cl.     | ☉ & ☉.  |
| 8 — 16.     | 3 0 0  | Sailed from the Cape of Good Hope. |                     |                           |                     |                        |         |         |   |
| 8 — 17.     | Noon.  |                                    |                     |                           | 32 14               | 15 52                  |         |         | Latitude observed.  |
| 24 — 18.    | Noon.  |                                    |                     |                           | 31 14               | 14 41                  |         |         | Ditto.  |
| 8 — 19.     | Noon.  |                                    |                     |                           | 31 4                | 14 27                  |         |         | Ditto.  |
| 24 — 20.    | Noon.  |                                    |                     |                           | 29 40               | 13 50                  |         |         | Ditto.  |
| ☉ — 21.     | Noon.  |                                    |                     |                           | 28 43               | 12 18                  |         |         | Ditto.  |
|             | 2 56 52  | 30 57 $\frac{2}{3}$                | 29 55 $\frac{1}{3}$ | U. 80 42 40               |                     | 12 47 $\frac{1}{2}$    |         | Cl.     | ☉ & ☉.  |
|             | 3 6 16   | 29 18                              | 31 21 $\frac{1}{3}$ | U. 80 46 00               | 28 36               | 11 59 $\frac{3}{4}$    |         | Cl.     | ☉ & ☉.  |
|             | 3 14 23  | 27 50 $\frac{1}{2}$                | 32 30               | U. 80 50 00               |                     | 11 49 $\frac{1}{4}$    |         | Cl.     | ☉ & ☉.  |
| 8 — 22.     | Noon.  |                                    |                     |                           | 27 27               | 10 36                  |         |         | Latitude observed.  |
| 8 — 23.     | Noon.  |                                    |                     |                           | 26 19               | 9 16                   |         |         | Ditto.  |
| 8 — 24.     | Noon.  |                                    |                     |                           | 25 6                | 8 40                   |         |         | Ditto.  |
| 24 — 25.    | Noon.  |                                    |                     |                           | 23 28               | 8 2                    |         |         | Latitude by account.  |
| 8 — 26.     | Noon.  |                                    |                     |                           | 21 40               | 5 40                   |         |         | Latitude.   |
| 24 — 27.    | Noon.  |                                    |                     |                           | 20 4                | 3 10                   |         |         | Ditto.  |
| ☉ — 28.     | Noon.  |                                    |                     |                           | 18 41               | 1 54                   |         |         | Ditto.  |
|             |  |                                    |                     |                           |                     | West Long.             |         |         |   |
| 8 — 29.     | Noon.  |                                    |                     |                           | 17 19               | 1 4                    |         |         | Ditto.  |
| 8 — 30.     | Noon.  |                                    |                     |                           | 16 11               | 2 58                   |         |         | Ditto.  |
| 8 May 1.    |  |                                    |                     |                           |                     |                        |         |         | At anchor before James' Fort, in the Island of St. Helena.        |
| 24 — 2      |  |                                    |                     |                           |                     |                        |         |         |   |
| 8 — 3       |  |                                    |                     |                           |                     |                        |         |         |   |
| 24 — 4.     |  |                                    |                     |                           |                     |                        |         |         | Latitude observed.  |
| ☉ — 5.      | Noon.  |                                    |                     |                           | 15 5                | 6 46                   |         |         |   |

# ASTRONOMICAL OBSERVATIONS.

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|         | Time by the Watch. | Alt. ☉'s L.L. or *  | Moon's Altitude.       | Dist. ☉'s L. from ☉ or *. | Ship's Latit. S. | Long. E. of Greenwich. | Thermo. | Observ. | PHENOMENA AND REMARKS.  |
|---------|--------------------|---------------------|------------------------|---------------------------|------------------|------------------------|---------|---------|---|
|         | H / "              | ° / '               | ° / '                  | ° / ' / "                 | ° / '            | ° / '                  |         |         |   |
|         | Noon.              |                     |                        |                           | 13 42            | 8 31                   |         |         | Latitude observed.  |
|         | Noon.              |                     |                        |                           | 12 5             | 10 15                  |         |         | Ditto.  |
|         | Noon.              |                     |                        |                           | 10 39            | 11 50                  |         |         | Ditto.  |
|         | 22 20 36           | 53 31 $\frac{1}{2}$ | 54 41 $\frac{1}{2}$ U. | 60 46 40                  |                  | 13 10                  |         | Cl.     | } Observed on the Q. Deck.  |
|         | 22 28 3            | 54 43 $\frac{1}{2}$ | 52 56 $\frac{2}{3}$ U. | 60 45 10                  | 9 23             | 12 40                  |         | Cl.     |   |
|         | 22 36 4            | 55 57 $\frac{1}{2}$ | 51 00 U.               | 60 41 50                  |                  | 13 16 $\frac{1}{2}$    |         | Cl.     |   |
|         | Noon.              |                     |                        |                           | 9 16             | 13 17                  |         |         | Latitude observed.  |
| +       | Noon.              |                     |                        |                           | 7 51             | 14 42                  |         |         | Ditto. The Island of Ascension E. by S. true, distant 4 or 5 leagues. |
| 7       | Noon.              |                     |                        |                           | 6 24             | 16 14                  |         |         | Latitude observed.  |
| ⊙       | Noon.              |                     |                        |                           | 4 38             | 17 30                  |         |         | Latitude by account.  |
| ☽       | Noon.              |                     |                        |                           | 2 58             | 18 48                  |         |         | Latitude observed.  |
| ♂       | Noon.              |                     |                        |                           | 1 26             | 20 1                   |         |         | Ditto.  |
|         |                    |                     |                        |                           | North.           |                        |         |         |   |
| 8       | Noon.              |                     |                        |                           | 0 14             | 21 1                   |         |         | Ditto.  |
| 24      | Noon.              |                     |                        |                           | 0 47             | 21 52                  |         |         | Ditto.  |
| 9       | Noon.              |                     |                        |                           | 1 39             | 22 38                  |         |         | Ditto.  |
| 12      | Noon.              |                     |                        |                           | 3 0              | 23 22                  |         |         | Ditto. Ship 14' north of the account.                                 |
| ⊙       | Noon.              |                     |                        |                           | 4 32             | 24 12                  |         |         | Ditto. Ship 16' north of the account.                                 |
| ☽       | Noon.              |                     |                        |                           | 5 38             | 24 49                  |         |         | Ditto. Ship 27' north of the log.                                     |
| ;       | 1 52 29            | 58 58               | 36 17 $\frac{1}{2}$ U. | 78 57 50                  |                  | 24 47 $\frac{1}{4}$    |         | Cl.     | } Observed on the Q. Deck.  |
|         | 1 58 35            | 57 39 $\frac{1}{2}$ | 37 55 $\frac{1}{2}$ U. | 79 0 40                   | 5 42             | 24 53                  |         | Cl.     |   |
|         | 2 5 10             | 56 19 $\frac{1}{2}$ | 39 15 $\frac{1}{2}$ U. | 79 2 50                   |                  | 24 59 $\frac{1}{2}$    |         | Cl.     |   |
| ♂       | Noon.              |                     |                        |                           | 6 8              | 25 8                   |         |         | Latitude observed.  |
| 8       | Noon.              |                     |                        |                           | 6 58             | 25 46                  |         |         | Latitude.   |
| 24      | Noon.              |                     |                        |                           | 7 49             | 26 18                  |         |         | Ditto.  |
| 9       | Noon.              |                     |                        |                           | 8 42             | 27 42                  |         |         | Latitude observed.  |
| 12      | Noon.              |                     |                        |                           | 9 41             | 29 2                   |         |         | Latitude.   |
| ⊙       | Noon.              |                     |                        |                           | 10 47            | 30 15                  |         |         | Ditto.  |
| ☽       | Noon.              |                     |                        |                           | 12 7             | 31 28                  |         |         | Ditto.  |
| ♂       | Noon.              |                     |                        |                           | 13 30            | 32 46                  |         |         | Ditto.  |
| 8       | Noon.              |                     |                        |                           | 15 19            | 34 4                   |         |         | Ditto.  |
| 24      | Noon.              |                     |                        |                           | 17 5             | 35 18                  |         |         | Ditto.  |
| 9       | Noon.              |                     |                        |                           | 18 50            | 36 56                  |         |         | Ditto.  |
| 12      | Noon.              |                     |                        |                           | 20 12            | 38 4                   |         |         | Latitude.   |
| June 1. | Noon.              |                     |                        |                           | 21 20            | 39 35                  |         |         | Latitude observed.  |
| ⊙       | Noon.              |                     |                        |                           | 22 21            | 40 46                  |         |         | Ditto.  |
| ☽       | Noon.              |                     |                        |                           | 23 40            | 41 48                  |         |         | Ditto.  |
| ♂       | Noon.              |                     |                        |                           |                  |                        |         |         | (1) ☽ & ☉. } Cloudy.  |
|         | 18 39 10           | 19 23               | 60 40 U.               | 91 16 30                  |                  | 42 4                   |         | Cl.     | } Observed on the Poop.   |
|         | 18 50 20           | 20 04               | 60 23 U.               | 91 15 0                   | 24 29            | 42 42                  |         | Cl.     |   |
|         | 22 16 16           | 66 00               | 23 14 U.               | 90 11 30                  |                  | 42 32 $\frac{1}{2}$    |         | Cl.     |   |
| 8       | Noon.              |                     |                        |                           | 24 31            | 43 2                   |         |         | Latitude observed.  |

## ASTRONOMICAL OBSERVATIONS.

| 1771.     | Time by the Watch. | Alt. ☉'s<br>L.L. or * | Moon's<br>Altitude.    | Dist. ☉'s L.<br>from ☉ or * | Ship's<br>Latit. N. | Long. W. of<br>Greenwich. | Thermo. | Oberv. | PHENOMENA<br>AND<br>REMARKS.       |
|-----------|--------------------|-----------------------|------------------------|-----------------------------|---------------------|---------------------------|---------|--------|------------------------------------|
|           | H / ' / "          | ° / ' / "             | ° / ' / "              | ° / ' / "                   | ° / ' / "           | ° / ' / "                 |         |        |                                    |
| ☿ June 5. | 19 12 45           | 25 6 $\frac{1}{3}$    | 64 48 $\frac{1}{3}$ U. | 79 57 50                    |                     | 43 53 $\frac{1}{2}$       |         | Cl.    | ☉ & ☉.                             |
|           | 19 17 20           | 25 54 $\frac{1}{3}$   | 64 31 U.               | 79 56 25                    |                     | 43 40 $\frac{1}{2}$       |         | Cl.    | ☉ & ☉.                             |
|           | 19 22 40           | 26 54 $\frac{2}{3}$   | 64 5 $\frac{2}{3}$ U.  | 79 55 45                    |                     | 43 58 $\frac{5}{6}$       |         | Cl.    | ☉ & ☉.                             |
|           | 19 28 17           | 28 30                 | 63 21 U.               | 79 53 30                    | 25 46               | 43 53                     |         | Cl.    | (1) ☉ & ☉. } Observed on the Poop. |
|           | 19 33 15           | 29 10                 | 63 11 U.               | 79 52 45                    |                     | 43 55 $\frac{5}{6}$       |         | Cl.    | (1) ☉ & ☉.                         |
|           | 19 50 41           | 33 26                 | 60 45 U.               | 79 48 30                    |                     | 43 25 $\frac{1}{4}$       |         | Cl.    | ☉ & ☉.                             |
|           | 19 53 40           | 34 8 $\frac{2}{3}$    | 60 16 $\frac{1}{3}$ U. | 79 47 20                    |                     | 43 37 $\frac{2}{3}$       |         | Cl.    | ☉ & ☉.                             |
| ☿ — 6.    | Noon.              |                       |                        |                             | 26 1                | 43 18                     |         |        | Latitude observed.                 |
| ☿ — 7.    | Noon.              |                       |                        |                             | 27 22               | 43 42                     |         |        | Ditto.                             |
|           | 20 54 4            | 47 49                 | 68 44 U.               | 56 28 25                    |                     | 44 7 $\frac{3}{4}$        |         | Cl.    | ☉ & ☉.                             |
|           | 21 4 10            | 49 7                  | 67 58 U.               | 56 27 0                     | 28 44               | 44 16 $\frac{1}{4}$       |         | Cl.    | ☉ & ☉. } Observed on the Poop.     |
|           | 21 23 8            | 54 12 $\frac{3}{4}$   | 64 43 $\frac{1}{3}$ U. | 56 20 5                     |                     | 43 58 $\frac{1}{4}$       |         | Cl.    | ☉ & ☉.                             |
|           | 21 30 0            | 55 28                 | 63 43 $\frac{2}{3}$ U. | 56 16 35                    |                     | 44 0 $\frac{1}{4}$        |         | Cl.    | ☉ & ☉.                             |
| ☿ — 8.    | Noon.              |                       |                        |                             | 28 50               | 43 42                     |         |        | Latitude observed.                 |
| ☉ — 9.    | Noon.              |                       |                        |                             | 30 11               | 44 17                     |         |        | Ditto.                             |
| ☿ — 10.   | Noon.              |                       |                        |                             | 31 12               | 45 6                      |         |        | Ditto.                             |
| ☿ — 11.   | Noon.              |                       |                        |                             | 32 16               | 45 38                     |         |        | Ditto.                             |
| ☿ — 12.   | Noon.              |                       |                        |                             | 33 8                | 45 25                     |         |        | Ditto.                             |
| ☿ — 13.   | Noon.              |                       |                        |                             | 34 14               | 45 5                      |         |        | Ditto.                             |
| ☿ — 14.   | Noon.              |                       |                        |                             | 35 28               | 44 36                     |         |        | Ditto.                             |
| ☿ — 15.   | Noon.              |                       |                        |                             | 37 2                | 42 50                     |         |        | Ditto.                             |
| ☉ — 16.   | Noon.              |                       |                        |                             | 38 18               | 41 42                     |         |        | Latitude observed.                 |
|           | 1 9 4              | 69 4 $\frac{5}{6}$    | 49 52 $\frac{2}{3}$ U. | 49 35 33                    |                     | 41 17                     |         | Cl.    | ☉ & ☉.                             |
|           | 1 13 44            | 68 23 $\frac{1}{6}$   | 50 30 $\frac{2}{3}$ U. | 49 37 30                    | 38 20               | 40 57 $\frac{1}{4}$       |         | Cl.    | ☉ & ☉. } Observed on the Poop.     |
|           | 2 41 1             | 52 38 $\frac{1}{6}$   | 61 17 $\frac{1}{3}$ U. | 50 11 20                    |                     | 41 14 $\frac{1}{2}$       |         | Cl.    | ☉ & ☉.                             |
|           | 2 45 30            | 51 49 $\frac{5}{6}$   | 61 32 U.               | 50 13 27                    |                     | 41 24                     |         | Cl.    | ☉ & ☉.                             |
| ☿ — 17.   | Noon.              |                       |                        |                             | 38 57               | 39 48                     |         |        | Latitude observed.                 |
|           | 0 51 29            | 70 46 $\frac{1}{3}$   | 34 8 $\frac{1}{3}$ U.  | 63 5 20                     |                     | 40 00                     |         | Cl.    | ☉ & ☉. } Observed on the Poop.     |
|           | 3 9 24             | 46 58 $\frac{1}{3}$   | 53 58 $\frac{2}{3}$ U. | 64 1 50                     | 39 00               | 39 47 $\frac{4}{5}$       |         | Cl.    | ☉ & ☉.                             |
|           | 3 12 50            | 46 10 $\frac{2}{3}$   | 54 19 U.               | 64 3 20                     |                     | 39 54 $\frac{1}{3}$       |         | Cl.    | ☉ & ☉.                             |
| ☿ — 18.   | Noon.              |                       |                        |                             | 39 52               | 38 20                     |         |        | Latitude observed.                 |
|           | 0 46 5             | 70 57 $\frac{2}{3}$   | 20 21 U.               | 76 24 30                    |                     | 37 52 $\frac{1}{4}$       |         | Cl.    | ☉ & ☉. } Observed on the Poop.     |
|           | 0 50 10            | 70 34 $\frac{1}{3}$   | 21 2 U.                | 76 26 23                    | 39 54               | 37 59 $\frac{2}{3}$       |         | Cl.    | ☉ & ☉.                             |
|           | 3 33 57            | 55 5 $\frac{2}{3}$    | 37 15 $\frac{1}{3}$ U. | 77 10 50                    |                     | 38 21                     |         | Cl.    | ☉ & ☉.                             |
| ☿ — 19.   | Noon.              |                       |                        |                             | 40 9                | 36 44                     |         |        | Latitude.                          |
| ☿ — 20.   | Noon.              |                       |                        |                             | 40 29               | 33 10                     |         |        | Ditto.                             |
| ☿ — 21.   | Noon.              |                       |                        |                             | 40 53               | 30 20                     |         |        | Ditto.                             |
| ☿ — 22.   | Noon.              |                       |                        |                             | 41 11               | 27 52                     |         |        | Ditto.                             |
| ☉ — 23.   | Noon.              |                       |                        |                             | 40 43               | 26 13                     |         |        | Ditto.                             |
| ☿ — 24.   | Noon.              |                       |                        |                             | 40 34               | 24 49                     |         |        | Ditto.                             |
| ☿ — 25.   | Noon.              |                       |                        |                             | 40 39               | 23 33                     |         |        | Ditto.                             |
| ☿ — 26.   | Noon.              |                       |                        |                             | 40 43               | 21 58                     |         |        | Ditto.                             |
| ☿ — 27.   | Noon.              |                       |                        |                             | 41 14               | 20 59                     |         |        | Ditto.                             |
| ☿ — 28.   | Noon.              |                       |                        |                             | 42 55               | 19 18                     |         |        | Ditto.                             |
| ☿ — 29.   | Noon.              |                       |                        |                             | 43 39               | 17 36                     |         |        | Ditto.                             |
| ☉ — 30.   | Noon.              |                       |                        |                             | 44 34               | 16 2                      |         |        | Latitude observed.                 |

# ASTRONOMICAL OBSERVATIONS.

65

| I.      | Time by the Watch. |   | Alt. ☉'s<br>L.L.or*  | Moon's<br>Altitude.    | Dist. ☽'s L.<br>from ☉ or *. | Ship's<br>Latit. N. | Long. W. of<br>Greenwich. | Thermo. | Observ. | PHENOMENA<br>AND<br>REMARKS. |
|---------|--------------------|---|--|------------------------|------------------------------|---------------------|---------------------------|---------|---------|------------------------------|
|         | H                  | " |  |                        |                              |                     |                           |         |         |                              |
| y 1.    | Noon.              |   |  |                        |                              | 44 54               | 13 59                     |         |         | Latitude observed.           |
| - 2.    | Noon.              |   |  |                        |                              | 45 54               | 13 2                      |         |         | Ditto.                       |
|         | 19 52 33           |   | 35 28 $\frac{1}{3}$  | 26 18 $\frac{2}{3}$ U. | 110 35 20                    |                     | 10 56 $\frac{1}{2}$       |         | Cl.     | } Observed on<br>the Poop.   |
|         | 19 56 40           |   | 36 12 $\frac{1}{2}$  | 25 46 U.               | 110 33 30                    | 45 24               | 11 00                     |         | Cl.     |                              |
|         | 20 24 38           |   | 41 5 $\frac{2}{3}$   | 21 14 $\frac{2}{3}$ U. | 110 21 40                    |                     | 10 46                     |         | Cl.     |                              |
| - 3.    | Noon.              |   |  |                        |                              | 45 24               | 11 59                     |         |         | Latitude observed.           |
| - 4.    | Noon.              |   |  |                        |                              | 45 29               | 10 46                     |         |         | Ditto.                       |
| - 5.    | Noon.              |   |  |                        |                              | 45 34               | 10 37                     |         |         | Ditto.                       |
| 2 — 6.  | Noon.              |   |  |                        |                              | 44 45               | 9 50                      |         |         | Ditto.                       |
|         | 19 41 56           |   | 33 23 $\frac{1}{3}$  | 59 2 $\frac{1}{3}$ U.  | 64 56 10                     |                     | 9 29 $\frac{1}{2}$        |         | Cl.     | } Observed on<br>the Poop.   |
|         | 19 46 56           |   | 34 14 $\frac{2}{3}$  | 59 10 $\frac{2}{3}$ U. | 64 54 10                     | 46 4                | 9 37 $\frac{3}{4}$        |         | Cl.     |                              |
|         | 19 50 24           |   | 35 13  | 59 2 $\frac{1}{3}$ U.  | 64 52 10                     |                     | 10 6                      |         | Cl.     |                              |
| ☉ — 7.  | Noon.              |   |  |                        |                              | 46 16               | 8 59                      |         |         | Latitude observed.           |
| ☽ — 8.  | Noon.              |   |  |                        |                              | 46 45               | 8 17                      |         |         | Ditto.                       |
|         | 20 23 00           |   | 39 58  | 60 7 $\frac{3}{5}$ U.  | 39 41 48                     |                     | 8 17 $\frac{1}{4}$        |         | Cl.     | } Observ. on<br>the Poop.    |
|         | 20 34 20           |   | 41 9 $\frac{2}{3}$   | 60 33 $\frac{1}{5}$ U. | 39 38 24                     | 48 2                | 7 57 $\frac{1}{2}$        |         | Cl.     |                              |
|         | 20 37 7            |   | 42 16  | 60 55 $\frac{1}{5}$ U. | 39 35 36                     |                     | 8 30 $\frac{1}{4}$        |         | Cl.     |                              |
| ☽ — 9.  | Noon.              |   |  |                        |                              | 48 19               | 7 30                      |         |         |                              |
| ☽ — 10. | Noon.              |   |  |                        |                              | 49 29               | 5 50                      |         |         |                              |
|         | 2 0 0              |   | Saw the Lizard Point.                                      |                        |                              |                     |                           |         |         |                              |
|         | 6 00 00            |   | The Lizard Point bore N. W. true, distant about 5 leagues. |                        |                              |                     |                           |         |         |                              |

OBSERVATIONS



# OBSERVATIONS

ON THE STATE OF THE

AIR, WINDS, WEATHER, &c.

AT

OTAHEITE,

From MAY the 10th, to JULY the 6th, 1769.

By CHARLES GREEN,

Formerly Assistant at the ROYAL OBSERVATORY, at Greenwich.





# METEOROLOGICAL OBSERVATIONS.

69

| 1769.    | Time of the Day. | In the Observa-<br>tory. |       | By the Clock in<br>the Tent. |       | Thermom.<br>in the Sun. | Hygrometer. | Winds.     | Weather, &c.   |
|----------|------------------|--------------------------|-------|------------------------------|-------|-------------------------|-------------|------------|--|
|          |                  | Barom.                   | Ther. | Barom.                       | Ther. |                         |             |            |  |
|          |                  | Inches.                  | °     | Inches.                      | °     |                         |             |            |  |
| ♂ May 9. | 21 47            | 30, 18                   | 86    | 30, 17                       | 82    |                         | 1 M.        | E. N. E.   | Brisk wind, and fair weather.  |
| ♂ — 10.  | 2 4              | 30, 16                   | 83    | 30, 15                       | 83    |                         | 0           | Ditto.     | Weather as yesterday.  |
|          | 21 30            | 30, 23                   | 90    | 29, 98                       | 83    |                         | 0           | Ditto.     |  |
| ♂ — 11.  | Noon.            | 30, 17                   | 89    | 29, 94                       | 90    |                         | 14 M.       | W. S. W.   | Showers.   |
|          | 21 17            | 30, 22                   | 89    | 30, 20                       | 85    |                         | 10 M.       | East.      |  |
| ♀ — 12.  | Noon.            | 30, 19                   | 89    | 30, 15                       | 87    |                         | 14 D.       | E. by N.   | Moderate wind, and clear weather,<br>except a heavy storm of wind and<br>rain, which happened about 2 P.M. |
|          | 2 38             | 30, 29                   | 85    | 30, 14                       | 90    |                         | 18 D.       | Ditto.     |  |
|          | 21 20            | 30, 35                   | 89    | 30, 15                       | 86    |                         | 2 M.        | Ditto.     | Wind moderate, clear air, and<br>pleasant weather.   |
| ♂ — 13.  | 2 30             | 30, 12                   | 83    | 30, 09                       | 85    |                         | 4 D.        | East.      |  |
|          | 18 0             | 30, 20                   | 77    | 30, 09                       | 75    |                         | 10 M.       | Ditto.     | Hazy: wind as above.   |
| ⊙ — 14.  | 21 30            | 30, 16                   | 87    | 30, 14                       | 86    |                         | 3 M.        | Ditto.     |  |
|          | 2 0              | 30, 20                   | 86    | 30, 19                       | 88    |                         | 2 D.        | E. S. E.   |  |
|          | 6 0              | 30, 14                   | 82    | 30, 08                       | 83    |                         | 3 M.        |            |  |
|          | 18 30            | 30, 32                   | 73    | 30, 04                       | 73    |                         | 21 M.       | East.      |  |
|          | 22 20            | 30, 17                   | 89    | 30, 07                       | 86    |                         | 8 M.        |            |  |
| ♂ — 15.  | 1 40             | 30, 00                   | 82    | 30, 05                       | 82    |                         | 9 M.        | E. by S.   | Rainy.<br>Cloudy, a remark. halo round Moon.   |
|          | 7 0              | 30, 08                   | 79    | 30, 04                       | 78    |                         | 19 M.       |            |  |
|          | 18 15            | 30, 10                   | 73    | 30, 05                       | 72    |                         | 24 M.       | S. by W.   | Much rain.   |
|          | 23 0             | 30, 17                   | 84    | 30, 11                       | 83    |                         | 23 M.       |            |  |
| ♂ — 16.  | 0 30             | 30, 17                   | 86    | 30, 11                       | 84    |                         | 10 M.       | Westerly.  | Brisk wind. Cloudy.  |
|          | 18 0             | 30, 00                   | 70    | 30, 19                       | 70    |                         | 20 M.       | Ditto.     | Brisk wind, and very clear.  |
|          | 21 30            | 30, 19                   | 88    | 30, 15                       | 84    | 96                      | 10 M.       | Ditto.     |  |
| ♂ — 17.  | Noon.            | 30, 11                   | 87    | 30, 00                       | 85    | 91                      | 7 D.        | Ditto.     | Very clear. Wind moderate.   |
|          | 18 30            | 30, 10                   | 71½   | 30, 05                       | 71½   |                         | 18 M.       | Ditto.     |  |
|          | 20 45            | 30, 10                   | 82    | 30, 10                       | 81    |                         | 11 M.       | Ditto.     | Cloudy. Fresh breezes.   |
| ♂ — 18.  | 0 30             | 30, 10                   | 89    | 30, 12                       | 86    | 93                      | 9 D.        | South.     |  |
|          | 3 40             | 30, 09                   | 82    | 30, 08                       | 83    | 92                      | 15 D.       | S. E.      | Clear. Light winds.  |
|          | 18 0             | 30, 16                   | 70    | 30, 10                       | 70    | 70                      | 14 M.       | E. S. E.   | Hazy. Showers in the night.  |
|          | 20 30            | 30, 20                   | 81    | 30, 14                       | 79    | 85                      | 9 M.        | Ditto.     | Clear, except towards the E. Calm.   |
| ♀ — 19.  | 0 45             | 30, 19                   | 82½   | 30, 12                       | 82½   | 86                      | 1 D.        | Westerly.  | Hazy, and some showers.  |
|          | 18 30            | 30, 19                   | 74    | 30, 11                       | 73    | 76                      | 25 M.       | East.      | Clo. Much rain in afternoon & night.   |
| ♂ — 20.  | Noon.            | 30, 22                   | 72    | 30, 19                       | 72    | 72                      | 33 M.       | E. N. E.   | Rainy. Moderate wind.  |
|          | 19 30            | 30, 20                   | 73    | 30, 14                       | 72    | 72                      | 29 M.       | East.      | Rain.  |
|          | 22 15            | 30, 25                   | 81    | 30, 22                       | 81    | 91                      | 13 M.       | Ditto.     | Little wind, and cloudy.   |
| ⊙ — 21.  | Noon.            | 30, 19                   | 82    | 30, 17                       | 83    |                         | 10 D.       | Ditto.     | Ditto.   |
|          | 18 30            | 30, 17                   | 75    | 30, 13                       | 74    | 75                      | 21 M.       | Ditto.     | Ditto.   |
|          | 21 40            | 30, 20                   | 80    | 30, 15                       | 80    | 85                      | 22 M.       | Ditto.     | Ditto.   |
| ♂ — 22.  | Noon.            | 30, 26                   | 69    | 30, 16                       | 72    | 70                      | 24 M.       | Southerly. | Thun. Lightn. & very heavy rain.   |
|          | 18 0             | 30, 16                   | 68    | 30, 08                       | 68    | 70                      | 40 M.       | Calm.      | Clear, except to the eastward.   |
|          | 21 40            | 30, 20                   | 84    | 30, 12                       | 81    | 88                      | 25 M.       | Ditto.     | Clear weather.   |
| ♂ — 23.  | 0 15             | 30, 17                   | 82    | 30, 11                       | 82    | 90                      | 15 M.       | Easterly.  | Ditto.   |
| ♂ — 24.  | 18 15            | 30, 10                   | 72    | 30, 10                       | 72    |                         | 30 M.       | Calm.      | Clear. Had been heavy rain in night  |
|          | 22 0             | 30, 17                   | 80    | 30, 13                       | 82    | 84                      | 18 M.       | Easterly.  | Cloudy, with showers.  |
| ♂ — 25.  | Noon.            | 30, 20                   | 84    | 30, 18                       | 83    | 89                      | 32 M.       | Variable.  | Moderate wind, & clou. with showers.   |
| ♀ — 26.  | 4 30             | 30, 29                   | 84    | 30, 13                       | 82    | 87                      | 25 M.       | E. N. E.   | Cloudy.  |
|          | 10 30            | 30, 18                   | 77    | 30, 13                       | 75    | 78                      | 35 M.       | N. E.      | Cloudy, with showers.  |
|          | 18 30            | 30, 18                   | 74    | 30, 14                       | 73    |                         | 42 M.       | South.     | Cloudy.  |
|          | 20 30            | 30, 21                   | 82    | 30, 15                       | 80    | 86                      | 35 M.       | East.      | Ditto, with showers.   |
| ♂ — 27.  | 0 30             | 30, 20                   | 86    | 30, 17                       | 84    | 88                      | 22 M.       | W. by N.   | Clear.   |
|          | 3 30             | 30, 18                   | 84    | 30, 14                       | 84    | 88                      | 16 M.       | Ditto.     | Ditto.   |
|          | 18 30            | 30, 21                   | 70    | 30, 14                       | 71    | 73                      | 32 M.       | East.      | Ditto.   |
|          | 20 45            | 30, 24                   | 82    | 30, 17                       | 79    | 85                      | 25 M.       | Ditto.     | Ditto.   |

| 1769.     | Time of the Day. | In the Observatory. |       | By the Clock in the Tent. |       | Thermom. in the Sun. | Hygrometer. | Winds.    | Weather, &c.                          |
|-----------|------------------|---------------------|-------|---------------------------|-------|----------------------|-------------|-----------|---------------------------------------|
|           |                  | Barom.              | Ther. | Barom.                    | Ther. |                      |             |           |                                       |
|           |                  | Inches.             | °     | Inches.                   | °     |                      |             |           |                                       |
| ☉ May 28. | Noon.            | 30, 24              | 84    | 30, 17                    | 85    | 98                   | 1 M.        | Eaft.     | Clear.                                |
|           | 3 00             | 30, 20              | 82    | 30, 17                    | 83    | 99                   | 2 M.        | Ditto.    | Ditto.                                |
|           | 18 30            | 30, 29              | 76    | 30, 16                    | 73    | 93                   | 32 M.       |           | Calm and clear.                       |
|           | 21 15            | 30, 28              | 84    | 30, 23                    | 84    | 102                  | 17 M.       |           | Ditto.                                |
| ☾ — 29.   | Noon.            | 30, 28              | 84    | 30, 23                    | 85    | 105                  | 0           | E. N. E.  | Light wind, and pleasant weather.     |
|           | 2 30             | 30, 20              | 79    | 30, 17                    | 84    | 86                   | 6 D.        | Ditto.    | Ditto.                                |
|           | 18 30            | 30, 22              | 69    | 30, 14                    | 69    | 69                   | 23 M.       | S. E.     | Ditto.                                |
| ♂ — 30.   | 0 30             | 30, 27              | 85    | 30, 29                    | 85    |                      | 2 D.        | Westerly. | Wind and weather variable. Lightning. |
|           | 7 0              | 30, 26              | 74    | 30, 17                    | 74    | 75                   | 8 M.        | Easterly. |                                       |
|           | 21 0             | 30, 19              | 82    | 30, 22                    | 80    | 90                   | 14 M.       | Westerly. |                                       |
| ♀ — 31.   | 0 30             | 30, 26              | 80    | 30, 21                    |       | 89                   |             | Ditto.    | Clear. Little wind.                   |
| ☉ June 1. | 0 30             | 30, 25              | 102   | 30, 15                    | 84    | 87                   | 4 D.        | West.     | Sun shone on the therm. in the Obs.   |
|           | 19 30            | 30, 20              | 88    | 30, 10                    | 71    | 85                   | 14 M.       | Calm.     | Clear.                                |
| ♀ — 2.    | 0 45             | 30, 20              | 83    | 30, 15                    | 87    | 95                   | 4 D.        | Eaft.     | Ditto.                                |
|           | 5 0              | 30, 15              | 78    | 30, 16                    | 84    | 82                   | 2 D.        | Ditto.    | Gentle breezes, and pleasant weather. |
|           | 19 0             | 30, 18              | 71    | 30, 15                    | 70    | 76                   | 30 M.       | Calm.     |                                       |
| ♂ — 3.    | 3 0              |                     | 86    |                           | 98    | 95                   |             |           | Clear and pleasant weather.           |
|           | 5 0              | 30, 20              | 86    | 30, 15                    | 98    | 94                   | 10 D.       | Calm.     |                                       |
|           | 18 15            | 30, 18              | 70    | 30, 10                    | 70    |                      | 25 M.       | S. E.     |                                       |
| ☉ — 4.    | Noon.            | 30, 20              | 87    | 30, 14                    | 87    | 94                   | 12 M.       | Eaft.     | Clear.                                |
|           | 18 30            | 30, 13              | 70    | 30, 10                    | 70    | 71                   | 25 M.       | S. E.     | Light winds.                          |
|           | 21 20            | 30, 19              | 83    | 30, 14                    | 83    | 87                   | 19 M.       | West.     |                                       |
| ☾ — 5.    | Noon.            | 30, 19              | 81    | 30, 14                    | 85    | 88                   | 14 M.       | Eaft.     | Ditto.                                |
|           | 2 39             | 30, 17              | 80    | 30, 15                    | 84    | 88                   | 13 M.       | Ditto.    | Ditto.                                |
|           | 18 15            | 30, 16              | 68    | 30, 08                    | 68    | 69                   | 25 M.       | Calm.     |                                       |
|           | 20 30            | 30, 18              | 79    | 30, 16                    | 80    | 87                   | 22 M.       | Eaft.     | Clear.                                |
| ♂ — 6.    | 3 37             | 30, 14              | 81    | 30, 10                    | 88    | 89                   | 12 M.       | Ditto.    | Ditto.                                |
|           | 18 45            | 30, 14              | 71    | 30, 12                    | 71    | 73                   | 30 M.       | Calm.     | Ditto.                                |
|           | 21 10            | 30, 20              | 85    | 30, 18                    | 83    | 89                   | 25 M.       | Ditto.    | Ditto.                                |
| ♀ — 7.    | 0 10             | 30, 20              | 82    | 30, 16                    | 86    | 96                   | 22 M.       | Eaft.     | Ditto.                                |
|           | 3 0              | 30, 17              | 82    | 30, 16                    | 86    | 89                   | 15 M.       | Ditto.    | Hazy; and cloudy in the evening.      |
|           | 18 30            | 30, 17              | 71    | 30, 14                    | 70    | 71                   | 30 M.       | Ditto.    | Hazy.                                 |
|           | 22 0             | 30, 20              | 84    | 30, 17                    | 83    | 92                   | 29 M.       | N. W.     | Clear.                                |
| ☉ — 8.    | 0 45             | 30, 20              | 86    | 30, 17                    | 86    | 98                   | 15 M.       | West.     | Ditto.                                |
|           | 4 0              | 30, 17              | 82    | 30, 14                    | 83    | 85                   | 10 M.       | Ditto.    | Ditto.                                |
|           | 18 45            | 30, 17              | 71    | 30, 14                    | 71    | 72                   | 30 M.       | Eaft.     | Cloudy.                               |
|           | 22 0             | 30, 19              | 81    | 30, 17                    | 84    | 89                   | 22 M.       | Ditto.    | Clear. Highwind.                      |
| ♀ — 9.    | 0 15             | 30, 16              | 80    | 30, 19                    | 83    | 86                   | 16 M.       | Ditto.    | Ditto. Wind very high.                |
|           | 2 30             | 30, 11              | 79    | 30, 14                    | 83    | 85                   | 19 M.       | Ditto.    | Ditto. Ditto.                         |
|           | 19 0             | 30, 13              | 73    | 30, 15                    | 73    | 76                   | 45 M.       | Ditto.    | Cloudy. Much rain all night.          |
|           | 23 0             | 30, 17              | 78    | 30, 18                    | 78    | 84                   | 30 M.       | Ditto.    |                                       |
| ♂ — 10.   | 4 0              | 30, 13              | 78    | 30, 10                    | 78    | 82                   | 30 M.       | Ditto.    | Clo. Wind very high. Rain all night.  |
|           | 18 45            | 30, 19              | 74    | 30, 12                    | 74    | 75                   | 50 M.       | Calm.     | Drizzling rain.                       |
|           | 22 0             | 30, 24              | 74    | 30, 20                    | 74    | 77                   | 50 M.       | Eaft.     | Calm. Heavy rain.                     |
| ☉ — 11.   | Noon.            | 30, 20              | 78    | 30, 16                    | 78    | 85                   | 38 M.       | Ditto.    | Cloudy. Wind pretty high.             |
|           | 20 0             | 30, 20              | 78    | 30, 15                    | 77    | 82                   | 40 M.       | E. by S.  | Hazy.                                 |
| ☾ — 12.   | Noon.            | 30, 17              | 81    | 30, 15                    | 82    | 86                   | 25 M.       | Eaft.     | Cloudy. Some rain. Wind high.         |
|           | 4 10             | 30, 17              | 81    | 30, 12                    | 82    | 89                   | 19 M.       | Ditto.    | Brisk wind. Some rain in the night.   |
|           | 18 30            | 30, 13              | 72    | 30, 07                    | 72    | 74                   | 39 M.       | Calm.     | Cloudy.                               |
|           | 21 30            | 30, 16              | 82    | 30, 16                    | 83    | 92                   | 35 M.       | Eaft.     | Clear.                                |
| ♂ — 13.   | 20 30            | 30, 16              | 81    | 30, 10                    | 80    | 98                   | 24 M.       | Calm.     | Ditto.                                |
| ♀ — 14.   | 0 30             | 30, 14              | 88    | 30, 10                    | 88    | 96                   | 1 M.        | Ditto.    | Ditto.                                |
|           | 4 30             | 30, 16              | 82    | 30, 12                    | 87    | 91                   | 12 M.       | Eaft.     | Cloudy.                               |
|           | 18 45            | 30, 13              | 70    | 30, 15                    | 70    | 75                   | 25 M.       | Calm.     | Clear.                                |

# METEOROLOGICAL OBSERVATIONS.

71

| 1769.      | Time of the Day. | In the Observa-<br>tory. |       | By the Clock in<br>the Tent. |       | Thermom.<br>in the Sun. | Hygrometer. | Winds.   | Weather, &c.                           |
|------------|------------------|--------------------------|-------|------------------------------|-------|-------------------------|-------------|----------|--|
|            |                  | Barom.                   | Ther. | Barom.                       | Ther. |                         |             |          |  |
|            |                  | Inches.                  | °     | Inches.                      | °     |                         |             |          |  |
| ☿ June 14. | 21 0             | 30, 14                   | 83    | 30, 13                       | 82    | 98                      | 19 M.       | Calm.    | Clear.                                 |
| ♃ — 15.    | 21 30            | 30, 08                   | 80    | 30, 05                       | 80    | 82                      | 35 M.       | N. W.    | Ditto.                                 |
| ♀ — 16.    | Noon.            | 30, 16                   | 82    | 30, 02                       | 87    | 91                      | 40 M.       | Ditto.   | Cloudy.                                |
|            | 19 30            | 30, 08                   | 71    | 30, 04                       | 70    | 74                      |             | East.    | Ditto. There had been a rainy night.   |
| ♂ — 17.    | 0 15             | 30, 13                   | 84    | 30, 10                       | 83    | 85                      | 14 M.       | Ditto.   | Hazy.                                  |
|            | 3 30             | 30, 10                   | 83    | 30, 05                       | 80    | 82                      | 2 M.        | N. W.    | Ditto.                                 |
|            | 21 30            | 30, 26                   | 78    | 30, 14                       | 79    | 94                      | 2 M.        | E. by N. | Clear.                                 |
| ☉ — 18.    | 0 15             | 30, 26                   | 83    | 30, 14                       | 82    | 86                      | 8 D.        | N. W.    | Clear.                                 |
|            | 3 30             | 30, 14                   | 76    | 30, 10                       | 77    | 82                      | 9 D.        | East.    | Cloudy. } Moderate wind.               |
|            | 14 45            | 30, 15                   | 66    | 30, 08                       | 65    | 66                      | 2 M.        | S. E.    | Clear.                                 |
|            | 20 0             | 30, 17                   | 72    | 30, 13                       | 72    | 84                      | 6 M.        | Calm.    | Clear.                                 |
| ♂ — 19.    | 0 30             | 30, 14                   | 80    | 30, 11                       | 82    | 83                      | 9 D.        | E. N. E. | Cloudy. Some squalls.                  |
|            | 3 30             | 30, 12                   | 76    | 30, 10                       | 79    | 85                      | 12 D.       | E. S. E. | Clear. } Wind moderate.                |
| ♂ — 20.    | 20 15            | 30, 12                   | 77    | 30, 10                       | 77    | 93                      | 10 M.       | Calm.    | Ditto.                                 |
|            | 0 10             | 30, 15                   | 83    | 30, 12                       | 82    | 88                      | 5 M.        | West.    | Ditto.                                 |
|            | 3 30             | 30, 18                   | 84    | 30, 08                       | 83    | 92                      | 0           | Ditto.   | Ditto. } Moderate wind.                |
|            | 19 30            | 30, 07                   | 70    | 30, 07                       | 70    | 85                      | 17 M.       | Calm.    | Ditto.                                 |
| ☿ — 21.    | 4 0              | 30, 10                   | 78    | 30, 12                       | 80    | 90                      | 11 D.       | East.    | Ditto.                                 |
|            | 20 30            | 30, 17                   | 82    | 30, 16                       | 80    | 108                     | 13 M.       | Calm.    | Ditto.                                 |
| ♃ — 22.    | 0 45             | 30, 20                   | 85    | 30, 15                       | 87    | 89                      | 6 D.        | East.    | Ditto. } Little wind.                  |
|            | 18 30            | 30, 17                   | 76    | 30, 16                       | 76    | 66                      | 9 M.        | S. E.    | Ditto.                                 |
| ♀ — 23.    | 16 0             | 30, 13                   | 67    | 30, 07                       | 66    | 66                      | 5 M.        | Ditto.   | Ditto. } Little wind.                  |
|            | 18 0             | 30, 11                   | 67    | 30, 06                       | 66    | 66                      | 5 M.        | Ditto.   | Ditto.                                 |
|            | 20 0             | 30, 16                   | 80    | 30, 11                       | 74    |                         | 4 M.        | Calm.    | Ditto.                                 |
| ♂ — 24.    | Noon.            | 30, 14                   | 80    | 30, 11                       | 80    | 85                      | 3 M.        | West.    | Cloudy. Stormy.                        |
|            | 4 0              | 30, 11                   | 78    | 30, 08                       | 82    | 87                      | 5 D.        | E. S. E. |  |
|            | 13 30            | 30, 11                   | 68    | 30, 08                       | 68    | 69                      | 9 M.        | Calm.    | Clear. } Light wind.                   |
|            | 20 45            | 30, 14                   | 82    | 30, 10                       | 77    | 89                      | 10 M.       | West.    | Ditto.                                 |
|            | 22 15            | 30, 18                   | 84    | 30, 15                       | 81    | 88                      | 0           | Calm.    | Ditto.                                 |
| ☉ — 25.    | Noon.            | 30, 15                   | 90    | 30, 15                       | 84    | 86                      | 6 D.        | N. N. W. | Ditto.                                 |
| ♂ — 26.    | Noon.            | 30, 14                   | 79    | 30, 14                       | 79    | 85                      | 2 D.        | East.    | Cloudy. } Some showers.                |
|            | 21 30            | 30, 14                   | 78    | 30, 13                       | 78    | 91                      | 22 M.       | Ditto.   | Clear.                                 |
| ♂ — 27.    | Noon.            | 30, 14                   | 81    | 30, 13                       | 83    | 91                      | 4 M.        | Ditto.   | Ditto.                                 |
|            | 2 30             | 30, 07                   | 78    | 30, 10                       | 80    |                         | 10 M.       | Ditto.   | Cloudy. } Some showers.                |
|            | 21 15            | 30, 20                   | 82    | 30, 15                       | 83    | 92                      | 10 M.       | Ditto.   | Clear.                                 |
| ☿ — 28.    | 0 15             | 30, 20                   | 83    | 30, 15                       | 86    | 90                      | 4 M.        | Ditto.   | Ditto. } Lightning and showers in      |
|            | 21 0             | 30, 13                   | 79    | 30, 19                       | 80    | 82                      | 21 M.       | Ditto.   | Cloudy. } the night.                   |
| ♃ — 29.    | 21 45            | 30, 14                   | 82    | 30, 16                       | 84    | 91                      | 20 M.       | E. S. E. | Clear.                                 |
| ♀ — 30.    | 19 0             | 30, 16                   | 74    | 30, 11                       | 74    |                         | 50 M.       | S. E.    | Cloudy. Much rain the preceding night. |
| ♂ July 1.  | 3 30             | 30, 15                   | 80    | 30, 14                       | 80    | 86                      | 51 M.       | East.    | Ditto. Heavy showers.                  |
|            | 18 30            | 30, 13                   | 70    |                              | 70    | 70                      | 45 M.       | S. E.    | Ditto.                                 |
|            | 20 15            | 30, 18                   | 76    | 30, 12                       | 75    |                         | 30 M.       | East.    | Clear. } Moderate wind.                |
| ☉ — 2.     | 0 15             | 30, 09                   | 82    | 30, 17                       | 84    | 88                      | 20 M.       | Ditto.   | Ditto.                                 |
|            | 3 45             | 30, 15                   | 83    | 30, 11                       | 84    | 87                      | 11 M.       | South.   | Ditto. } Light winds.                  |
|            | 18 30            | 30, 12                   | 71    | 30, 08                       | 71    | 77                      | 30 M.       | Calm.    | Cloudy.                                |
|            | 21 15            | 30, 18                   | 82    | 30, 11                       | 82    | 88                      | 25 M.       | Ditto.   | Clear.                                 |
| ♂ — 3.     | 2 30             | 30, 14                   | 81    | 30, 11                       | 86    | 95                      | 6 M.        | East.    | Ditto.                                 |
|            | 19 0             | 30, 11                   | 71    | 30, 11                       | 70    | 78                      | 15 M.       | S. S. E. | Ditto. } Moderate wind.                |
| ♂ — 4.     | 0 15             | 30, 14                   | 89    | 30, 14                       | 88    | 87                      | 2 M.        | E. by S. | Ditto.                                 |
|            | 4 15             | 30, 10                   | 84    | 30, 13                       | 84    | 96                      | 6 D.        | Calm.    | Ditto. Light winds.                    |
|            | 19 15            | 30, 17                   | 73    | 30, 12                       | 73    | 81                      | 19 M.       | Ditto.   | Ditto.                                 |
| ☿ — 5.     | 18 30            | 30, 22                   | 72    | 30, 13                       | 71    | 74                      | 25 M.       | Ditto.   | Cloudy.                                |
| ♃ — 6.     | 4 15             | 30, 18                   | 78    | 30, 17                       | 80    | 83                      | 12 M.       | East.    | Clear. High wind.                      |
|            | 19 0             | 30, 18                   | 76    | 30, 15                       | 75    | 77                      | 22 M.       | Ditto.   | Wind very high.                        |



A  
T A B L E

OF THE  
V A R I A T I O N S   O F   T H E   C O M P A S S ,

Observed on Board His MAJESTY's Ship, the DOLPHIN,  
In her SECOND VOYAGE Round the WORLD,

UNDER THE COMMAND OF

S A M U E L   W A L L I S, Esq.





# VARIATIONS OF THE COMPASS.

75

| 1766.                                  | Latitude of the Ship. North. | Longit. of the Ship. West. | Variation of the Compass. West. | Time when and Means. | 1766.       | Latitude of the Ship. North. | Longit. of the Ship. West. | Variation of the Compass. West. | Time when and Means. |
|--|------------------------------|----------------------------|---------------------------------|----------------------|-------------|------------------------------|----------------------------|---------------------------------|----------------------|
| Aug. 22.                               | 49 29                        | 6 9                        | 21 0                            | M. Amp.              | ♀ Octo. 17. | 3 40                         | 22 15                      | 9 35                            | M. Amp.              |
| — 27.                                  | 46 55                        | 7 18                       | 21 16                           | E. Amp.              | — 18.       | 3 40                         | 22 15                      | 9 30                            | M. Azim.             |
| — 28.                                  | 46 59                        | 8 30                       | 21 37                           | M. Amp.              | — 19.       | 2 55                         | 21 50                      | 9 0                             | M. Azim.             |
| — 29.                                  | 45 27                        | 9 0                        | 19 16                           | E. Amp.              | — 20.       | 2 32                         | 22 14                      | 9 30                            | E. Azim.             |
| — 31.                                  | 44 50                        | 9 36                       | 17 38                           | M. Amp.              | — 21.       | 1 48                         | 23 5                       | 8 0                             | E. Azim.             |
| Sept. 3.                               | 38 48                        | 13 15                      | 15 40                           | M. Azim.             | — 22.       | 0 42                         | 23 42                      | 8 5                             | Ditto.               |
| — 5.                                   | 38 20                        | 13 30                      | 16 0                            | E. Amp.              | — 23.       | 0 6                          | 24 10                      | 6 12                            | M. Amp.              |
| — 6.                                   | 35 41                        | 14 30                      | 13 30                           | Ditto.               | South.      | 0 28                         | 24 25                      | 5 13                            | E. Amp.              |
| — 12.                                  | 34 45                        | 15 0                       | 12 25                           | M. Azim.             | — 24.       | 1 42                         | 25 5                       | 5 8                             | E. Azim.             |
| — 13.                                  | 32 17                        | 17 8                       | 15 50                           | E. Amp.              | — 25.       | 2 40                         | 25 43                      | 4 25                            | M. Amp.              |
| — 15.                                  | 32 14                        | 17 15                      | 15 43                           | M. Amp.              | — 26.       | 3 12                         | 26 10                      | 3 45                            | E. Amp.              |
| — 17.                                  | 31 51                        | 17 20                      | 15 0                            | E. Amp.              | — 27.       | 4 3                          | 26 55                      | 2 16                            | M. Azim.             |
| — 18.                                  | 28 29                        | 18 22                      | 14 0                            | Ditto.               | — 28.       | 4 30                         | 27 10                      | 2 40                            | E. Amp.              |
| — 19.                                  | 24 0                         | 19 35                      | 12 33                           | E. Azim.             | — 29.       | 6 48                         | 28 25                      | 1 11                            | M. Azim.             |
| — 21.                                  | 21 18                        | 20 06                      | 11 40                           | Ditto.               | — 30.       | 7 34                         | 28 40                      | 1 42                            | E. Amp.              |
| — 22.                                  | 20 4                         | 20 46                      | 11 10                           | M. Azim.             | — 31.       | 8 24                         | 29 10                      | 0 52                            | M. Amp.              |
| — 23.                                  | 19 11                        | 21 16                      | 10 58                           | E. Azim.             | — 32.       | 9 18                         | 29 25                      | 1 26                            | E. Azim.             |
| — 24.                                  | 17 24                        | 21 50                      | 9 30                            | M. Azim.             | — 33.       | 11 25                        | 30 25                      | 1 0                             | Ditto.               |
| — 25.                                  | 17 10                        | 22 0                       | 8 30                            | E. Amp.              | — 34.       | 11 25                        | 30 25                      | 1 0                             | E. Amp.              |
| — 26.                                  | 16 40                        | 21 55                      | 8 14                            | M. Amp.              | — 35.       | 12 30                        | 30 50                      | 1 30                            | M. Amp.              |
| The Island of Sall W. N. W. 6 leagues. |                              |                            |                                 |                      | — 36.       | 15 30                        | 31 40                      | 1 0                             | E. Azim.             |
| — 27.                                  | 16 6                         | 21 53                      | 9 0                             | E. Azim.             | — 37.       | 16 45                        | 32 10                      | 1 57                            | M. Azim.             |
| — 28.                                  | 15 15                        | 22 0                       | 9 40                            | M. Amp.              | — 38.       | 22 25                        | 37 5                       | 6 41                            | Ditto.               |
| — 29.                                  | 14 48                        | 23 30                      | 8 30                            | E. Amp.              | — 39.       | 23 28                        | 38 22                      | 7 0                             | M. Amp.              |
| — 30.                                  | 14 30                        | 23 30                      | 7 50                            | M. Amp.              | — 40.       | 24 8                         | 38 45                      | 7 20                            | E. Azim.             |
| — 31.                                  | 14 20                        | 23 28                      | 8 40                            | E. Amp.              | — 41.       | 24 9                         | 38 50                      | 7 0                             | E. Amp.              |
| — 32.                                  | 13 12                        | 23 25                      | 7 43                            | Ditto.               | — 42.       | 26 24                        | 40 10                      | 8 11                            | E. Azim.             |
| — 33.                                  | 11 56                        | 23 22                      | 7 9                             | M. Amp.              | — 43.       | 27 28                        | 40 45                      | 10 15                           | M. Amp.              |
| — 34.                                  | 11 55                        | 23 22                      | 6 58                            | M. Azim.             | — 44.       | 27 30                        | 40 45                      | 10 10                           | M. Azim.             |
| — 35.                                  | 10 40                        | 23 32                      | 7 27                            | M. Amp.              | — 45.       | 29 48                        | 43 10                      | 9 30                            | Ditto.               |
| — 36.                                  | 10 11                        | 23 46                      | 7 0                             | Ditto.               | — 46.       | 30 32                        | 44 0                       | 10 47                           | E. Azim.             |
| — 37.                                  | 9 57                         | 23 40                      | 5 50                            | E. Amp.              | — 47.       | 32 45                        | 47 4                       | 13 05                           | M. Azim.             |
| — 38.                                  | 9 29                         | 23 40                      | 6 20                            | M. Amp.              | — 48.       | 33 22                        | 47 30                      | 14 0                            | E. Amp.              |
| — 39.                                  | 9 0                          | 23 36                      | 6 33                            | E. Amp.              | — 49.       | 33 50                        | 47 45                      | 14 10                           | M. Amp.              |
| — 40.                                  | 7 15                         | 23 40                      | 5 40                            | E. Azim.             | — 50.       | 33 50                        | 47 45                      | 13 30                           | M. Azim.             |
| — 41.                                  | 6 28                         | 22 3                       | 8 20                            | Ditto.               | — 51.       | 34 27                        | 48 20                      | 14 30                           | Ditto.               |
| — 42.                                  | 6 27                         | 22 3                       | 8 4                             | E. Amp.              | — 52.       | 34 44                        | 48 42                      | 15 0                            | E. Amp.              |
| — 43.                                  | 5 59                         | 21 25                      | 8 40                            | E. Azim.             | — 53.       | 34 48                        | 49 5                       | 15 6                            | M. Amp.              |
| — 44.                                  | 5 2                          | 20 45                      | 8 38                            | M. Azim.             | — 54.       | 34 50                        | 49 15                      | 15 18                           | E. Amp.              |
| — 45.                                  | 4 28                         | 21 10                      | 9 10                            | Ditto.               | — 55.       | 35 19                        | 50 15                      | 15 0                            | M. Amp.              |
| — 46.                                  | 4 13                         | 21 25                      | 9 46                            | E. Azim.             | — 56.       | 36 46                        | 52 8                       | 15 0                            | E. Amp.              |
| — 47.                                  | 4 2                          | 21 35                      | 8 17                            | M. Amp.              |             |                              |                            |                                 |                      |
| — 48.                                  | 3 42                         | 21 30                      | 9 30                            | E. Amp.              |             |                              |                            |                                 |                      |

## VARIATIONS OF THE COMPASS.

| 1766.       | Latitude of<br>the Ship.<br>South.       | Longit. of<br>the Ship.<br>West. | Variation<br>of the<br>Compass.<br>East. | Time when<br>and<br>Means. | 1767.     | Latitude of<br>the Ship.<br>South. | Longit. of<br>the Ship.<br>West. | Variation<br>of the<br>Compass.<br>East. | Time when<br>and<br>Means. |
|-------------|--|----------------------------------|--|----------------------------|-----------|------------------------------------|----------------------------------|--|----------------------------|
|             | ° /                                      | ° /                              | ° /                                      |                            |           | ° /                                | ° /                              | ° /                                      |                            |
| 24 Nov. 20. | 36 50                                    | 52 20                            | 16 40                                    | M. Azim.                   | ♂ May 5.  | 27 21                              | 96 35                            | 7 50                                     | E. Amp.                    |
|             | 37 15                                    | 52 10                            | 16 9                                     | E. Amp.                    | ♀ — 8.    | 27 5                               | 98 20                            | 7 11                                     | M. Amp.                    |
| ♀ — 21.     | 37 40                                    | 51 35                            | 14 30                                    | M. Azim.                   |           | 27 15                              | 98 57                            | 7 0                                      | E. Azim.                   |
|             | 37 40                                    | 51 35                            | 15 10                                    | Ditto.                     | ♂ — 9.    | 27 33                              | 99 50                            | 6 28                                     | M. Azim.                   |
|             | 37 43                                    | 51 45                            | 16 24                                    | E. Amp.                    |           | 27 31                              | 100 5                            | 7 6                                      | E. Azim.                   |
| ♂ — 22.     | 39 8                                     | 54 18                            | 17 36                                    | E. Azim.                   | ⊙ — 10.   | 27 35                              | 101 58                           | 6 9                                      | M. Amp.                    |
| ⊙ — 23.     | 40 22                                    | 55 45                            | 17 20                                    | E. Amp.                    | ♂ — 11.   | 27 30                              | 104 35                           | 4 40                                     | M. Azim.                   |
| ♂ — 24.     | 40 32                                    | 56 05                            | 17 5                                     | M. Amp.                    |           | 27 30                              | 105 24                           | 6 40                                     | E. Azim.                   |
|             | 40 48                                    | 56 35                            | 18 0                                     | E. Azim.                   | ♂ — 12.   | 27 13                              | 106 5                            | 6 29                                     | Ditto.                     |
| ♂ — 25.     | 41 44                                    | 57 30                            | 18 32                                    | Ditto.                     | ♀ — 13.   | 26 37                              | 105 51                           | 6 29                                     | M. Azim.                   |
| 24 — 27.    | 40 52                                    | 59 0                             | 20 26                                    | Ditto.                     |           | 26 21                              | 105 33                           | 4 52                                     | E. Azim.                   |
| ♀ — 28.     | 41 17                                    | 58 28                            | 18 12                                    | Ditto.                     | 24 — 14.  | 26 2                               | 105 12                           | 1 58                                     | M. Azim.                   |
| ♂ — 29.     | 41 42                                    | 59 51                            | 17 30                                    | M. Azim.                   | ♀ — 15.   | 24 57                              | 103 20                           | 3 36                                     | Ditto.                     |
|             | 42 27                                    | 60 46                            | 18 32                                    | E. Amp.                    |           | 24 39                              | 103 5                            | 3 54                                     | E. Azim.                   |
| ⊙ — 30.     | 43 19                                    | 60 45                            | 18 5                                     | Ditto.                     |           | 24 38                              | 103 4                            | 4 2                                      | E. Amp.                    |
| ♂ Dec. 1.   | 43 45                                    | 60 50                            | 18 2                                     | M. Azim.                   | ♂ — 16.   | 23 39                              | 102 45                           | 6 8                                      | E. Azim.                   |
|             | 44 9                                     | 60 40                            | 18 10                                    | E. Azim.                   | ⊙ — 17.   | 22 42                              | 103 55                           | 3 30                                     | M. Azim.                   |
| ♂ — 2.      | 44 45                                    | 61 40                            | 18 2                                     | M. Azim.                   | ♂ — 18.   | 21 59                              | 105 56                           | 4 9                                      | M. Amp.                    |
|             | 45 21                                    | 61 40                            | 18 48                                    | E. Azim.                   | ♂ — 19.   | 21 24                              | 107 51                           | 5 5                                      | M. Azim.                   |
| ♀ — 3.      | 46 20                                    | 62 30                            | 18 52                                    | Ditto.                     | ♀ — 20.   | 20 54                              | 109 15                           | 4 32                                     | M. Amp.                    |
| 24 — 4.     | 46 40                                    | 62 45                            | 19 40                                    | M. Amp.                    |           | 20 54                              | 109 15                           | 4 39                                     | M. Azim.                   |
|             | 46 40                                    | 62 45                            | 20 00                                    | M. Azim.                   | 24 — 21.  | 20 19                              | 110 58                           | 5 20                                     | E. Azim.                   |
| ♂ — 6.      | 47 26                                    | 65 15                            | 18 5                                     | E. Azim.                   | ♀ — 22.   | 20 18                              | 112 29                           | 4 41                                     | Ditto.                     |
| ⊙ — 7.      | 47 16                                    | 65 15                            | 19 20                                    | M. Amp.                    | ♂ — 23.   | 20 18                              | 113 44                           | 4 57                                     | M. Azim.                   |
|             | 47 47                                    | 66 0                             | 18 49                                    | E. Azim.                   |           | 20 18                              | 114 36                           | 4 57                                     | E. Amp.                    |
| ♂ — 8.      | 49 0                                     | 66 40                            | 23 12                                    | Ditto.                     | ⊙ — 24.   | 20 19                              | 116 4                            | 4 17                                     | Ditto.                     |
| ♂ — 9.      | 49 9                                     | 67 10                            | 21 55                                    | M. Azim.                   | ♂ — 25.   | 20 23                              | 116 26                           | 4 38                                     | M. Azim.                   |
|             | 49 31                                    | 67 45                            | 20 34                                    | E. Azim.                   |           | 20 25                              | 117 0                            | 4 20                                     | E. Azim.                   |
| 24 — 11.    | 51 10                                    | 68 5                             | 23 6                                     | E. Amp.                    | ♀ — 27.   | 20 34                              | 121 25                           | 5 20                                     | Ditto.                     |
| ♂ — 13.     | 50 46                                    | 68 30                            | 24 0                                     | E. Azim.                   |           | 20 35                              | 121 27                           | 4 53                                     | E. Amp.                    |
| ⊙ — 14.     | 50 56                                    | 68 50                            | 24 11                                    | Ditto.                     | 24 — 28.  | 20 40                              | 122 47                           | 4 0                                      | M. Amp.                    |
| ♂ — 15.     | 50 48                                    | 68 47                            | 20 45                                    | M. Azim.                   | ♀ — 29.   | 20 44                              | 124 50                           | 4 40                                     | Ditto.                     |
|             | 51 21                                    | 68 51                            | 19 16                                    | E. Azim.                   | ♂ — 30.   | 20 44                              | 125 52                           | 4 20                                     | M. Azim.                   |
| ♀ — 19.     | 52 28                                    |                                  | 24 8                                     | Point Posses-              |           | 20 43                              | 126 16                           | 5 20                                     | E. Azim.                   |
|             | sion in the Straits of Magalhaens, West. |                                  |  |                            | ⊙ — 31.   | 20 40                              | 127 3                            | 7 10                                     | M. Azim.                   |
| 1767.       |  |                                  |  |                            |           | 20 37                              | 127 52                           | 5 4                                      | E. Azim.                   |
| ♂ April 15. | 47 6                                     | 88 0                             | 16 14                                    | M. Azim.                   |           | 20 37                              | 127 55                           | 5 14                                     | E. Amp.                    |
| ♂ — 21.     | 41 59                                    | 95 34                            | 11 6                                     | E. Azim.                   | ♂ June 1. | 20 53                              | 129 29                           | 5 45                                     | M. Azim.                   |
| ⊙ — 26.     | 38 35                                    | 97 30                            | 9 50                                     | Ditto.                     | ♂ — 2.    | 19 30                              | 130 4                            | 5 40                                     | E. Azim.                   |
| ♂ — 27.     | 37 12                                    | 98 47                            | 8 37                                     | M. Azim.                   | ♀ — 3.    | 19 10                              | 131 11                           | 5 45                                     | M. Amp.                    |
| 24 — 30.    | 33 5                                     | 98 23                            | 5 5                                      | Ditto.                     |           | 19 10                              | 131 11                           | 5 42                                     | M. Azim.                   |
| ⊙ May 3.    | 29 10                                    | 97 45                            | 5 44                                     | E. Azim.                   |           | 19 10                              | 132 1                            | 5 3                                      | E. Amp.                    |
| ♂ — 4.      | 28 29                                    | 97 37                            | 6 15                                     | M. Azim.                   | 24 — 4.   | 19 5                               | 133 5                            | 4 49                                     | M. Amp.                    |
|             | 28 15                                    | 97 25                            | 6 35                                     | E. Azim.                   | ♀ — 5.    | 19 15                              | 135 7                            | 5 48                                     | Ditto.                     |
| ♂ — 5.      | 27 28                                    | 96 45                            | 5 45                                     | M. Amp.                    |           | 19 21                              | 136 6                            | 6 0                                      | E. Amp.                    |

| 1767.    | Latitude of the Ship. South. | Longit of the Ship. West. | Variation of the Compaſs. Eaſt. | Time when and Means. | 1767.    | Latitude of the Ship. South. | Longit. of the Ship. West. | Variation of the Compaſs. Eaſt. | Time when and Means. |
|----------|------------------------------|---------------------------|---------------------------------|----------------------|----------|------------------------------|----------------------------|---------------------------------|----------------------|
| June 9.  | 19 18                        | 138 20                    | 4 46                            |                      | Aug. 22. | 5 59                         | 183 16                     | 11 54                           | E. Azim.             |
| — 12.    | 19 2                         | 141 4                     | 7 10                            | E. Azim.             | — 23.    | 4 31                         | 184 23                     | 10 49                           | E. Amp.              |
| — 13.    | 18 55                        | 142 21                    | 4 38                            | Ditto.               | — 24.    | 4 25                         | 185 26                     | 10 56                           | M. Amp.              |
| — 16.    | 18 21                        | 145 56                    | 6 0                             | M. Azim.             |          | 4 21                         | 185 30                     | 11 15                           | M. Azim.             |
| — 17.    | 17 56                        | 147 15                    | 7 0                             | E. Amp.              | — 25.    | 3 34                         | 186 15                     | 10 30                           | E. Azim.             |
| — 18.    | 17 52                        | 148 35                    | 7 10                            | Ditto.               | — 26.    | 3 24                         | 185 31                     | 11 22                           | M. Azim.             |
| — 19.    | 17 48                        | 149 10                    | 5 19                            | Ditto.               | — 27.    | 2 39                         | 186 39                     | 11 19                           | Ditto.               |
| — 20.    | 17 50                        | 149 6                     | 4 50                            | M. Amp.              |          | 1 56                         | 187 1                      | 10 32                           | M. Amp.              |
|          | 17 50                        | 149 4                     | 4 28                            | M. Azim.             |          | 1 53                         | 187 4                      | 11 36                           | M. Azim.             |
|          | 17 29                        | 149 25                    | 5 36                            | at Otaheite.         |          | 0 46                         | 187 40                     | 9 46                            | E. Azim.             |
| July 29. | 17 10                        | 152 29                    | 8 0                             | M. Azim.             |          | 0 43                         | 187 34                     | 10 4                            | E. Amp.              |
|          | 17 1                         | 153 34                    | 7 52                            | E. Azim.             |          | North.                       |                            |                                 |                      |
| Aug. 1.  | 16 48                        | 157 17                    | 8 43                            | Ditto.               | — 28.    | 0 8                          | 187 41                     | 11 5                            | M. Azim.             |
| — 2.     | 17 6                         | 157 47                    | 9 0                             | M. Azim.             | — 30.    | 4 11                         | 188 32                     | 11 0                            | M. Amp.              |
|          | 17 15                        | 159 13                    | 9 32                            | E. Azim.             |          | 4 15                         | 188 36                     | 10 47                           | M. Azim.             |
| — 3.     | 17 32                        | 160 46                    | 9 26                            | Ditto.               |          | 5 9                          | 188 47                     | 11 0                            | E. Azim.             |
| — 5.     | 17 39                        | 162 3                     | 9 30                            | M. Amp.              |          | 5 13                         | 188 47                     | 11 0                            | E. Amp.              |
|          | 17 39                        | 162 42                    | 9 7                             | E. Amp.              | — 31.    | 6 6                          | 189 26                     | 11 40                           | M. Azim.             |
| — 6.     | 17 40                        | 164 3                     | 10 37                           | E.                   |          | 7 10                         | 189 53                     | 11 18                           | E. Azim.             |
| — 7.     | 17 40                        | 164 35                    | 10 40                           | M.                   | Sept. 1. | 8 7                          | 191 2                      | 12 0                            | M. Azim.             |
| — 9.     | 16 38                        | 167 39                    | 10 39                           | E. Azim.             |          | 8 53                         | 191 18                     | 10 0                            | E. Azim.             |
|          | 16 38                        | 167 41                    | 10 52                           | E. Amp.              |          | 8 57                         | 191 19                     | 10 34                           | E. Amp.              |
| — 10.    | 16 17                        | 169 33                    | 9 42                            | M. Azim.             | — 2.     | 10 4                         | 191 56                     | 12 0                            | M. Amp.              |
| — 11.    | 15 59                        | 172 30                    | 11 40                           | E. Azim.             |          | 10 8                         | 191 58                     | 11 54                           | M. Azim.             |
| — 12.    | 15 51                        | 173 23                    | 10 12                           | M. Amp.              | — 3.     | 11 22                        | 193 18                     | 11 40                           | Ditto.               |
|          | 15 55                        | 173 33                    | 11 30                           | E. Azim.             |          | 11 55                        | 193 34                     | 10 40                           | E. Azim.             |
| — 13.    | 15 55                        | 174 2                     | 11 44                           | M. Azim.             | — 4.     | 12 49                        | 193 48                     | 11 20                           | M. Azim.             |
|          | 15 52                        | 174 35                    | 11 11                           | E. Azim.             | — 5.     | 13 48                        | 195 14                     | 12 30                           | Ditto.               |
| — 14.    | 15 42                        | 175 26                    | 12 4                            | Ditto.               | — 6.     | 14 8                         | 196 45                     | 12 19                           | Ditto.               |
| — 15.    | 14 14                        | 176 48                    | 10 10                           | Ditto.               |          | 14 10                        | 197 26                     | 11 0                            | E. Amp.              |
| — 17.    | 12 49                        | 177 46                    | 9 15                            | M. Azim.             | — 7.     | 14 7                         | 198 3                      | 10 20                           | M. Amp.              |
|          | 11 47                        | 178 38                    | 11 0                            | E. Azim.             | — 8.     | 13 58                        | 199 56                     | 11 0                            | Ditto.               |
|          | 11 44                        | 178 34                    | 10 10                           | E. Amp.              | — 9.     | 13 48                        | 201 58                     | 10 0                            | M. Azim.             |
| — 18.    | 11 25                        | 179 0                     | 9 5                             | M. Azim.             |          | 13 53                        | 202 32                     | 8 30                            | E. Azim.             |
|          | 10 26                        | 179 40                    | 10 30                           | E. Azim.             | — 10.    | 14 2                         | 203 37                     | 9 4                             | M. Amp.              |
| — 19.    | 9 57                         | 180 3                     | 10 30                           | M. Amp.              | — 11.    | 14 10                        | 204 42                     | 9 20                            | Ditto.               |
|          | 9 52                         | 180 7                     | 10 20                           | M. Azim.             |          | 14 10                        | 204 44                     | 8 47                            | M. Azim.             |
|          | 8 48                         | 180 47                    | 10 30                           | E. Azim.             | — 12.    | 14 33                        | 205 50                     | 9 21                            | Ditto.               |
| — 20.    | 8 36                         | 181 8                     | 10 20                           | M. Amp.              |          | 14 42                        | 206 27                     | 7 42                            | E. Azim.             |
|          | 7 40                         | 181 59                    | 10 7                            | E. Azim.             |          | 14 43                        | 206 30                     | 8 0                             | E. Amp.              |
| — 21.    | 7 25                         | 182 12                    | 10 50                           | M. Amp.              | — 14.    | 15 7                         | 208 49                     | 7 35                            | M. Azim.             |
|          | 7 23                         | 182 15                    | 10 32                           | M. Azim.             | — 15.    | 15 3                         | 209 58                     | 7 48                            | M. Amp.              |
|          | 7 7                          | 182 29                    | 10 32                           | E. Azim.             | — 16.    | 15 0                         | 211 34                     | 8 32                            | M. Azim.             |
|          | 6 47                         | 182 35                    | 10 20                           | M. Amp.              | — 17.    | 15 1                         | 212 52                     | 7 40                            | E. Azim.             |
| — 22.    | 6 45                         | 182 38                    | 10 32                           | M. Azim.             |          | 15 1                         | 212 53                     | 6 41                            | E. Amp.              |

## VARIATIONS OF THE COMPASS.

| 1767.       | Latitude of the Ship. North. | Longit. of the Ship. West. | Variation of the Compass. East. | Time when and Means. | 1768.     | Latitude of the Ship. South. | Longit. of the Ship. East. | Variation of the Compass. West. | Time when and Means.       |
|-------------|------------------------------|----------------------------|---------------------------------|----------------------|-----------|------------------------------|----------------------------|---------------------------------|----------------------------|
| ♀ Sept. 18. | 15 0                         | 213 47                     | 6 10                            | M. Azim.             | ♀ Jan. 6. | 21 10                        | 70 34                      | 5 29                            | M. Azim.                   |
| ⊙ Octo. 18. | 17 21                        | 218 24                     | 5 15                            | Ditto.               | ♂ — 7.    | 21 30                        | 68 21                      | 6 30                            | M. Amp.                    |
| ♂ — 19.     | 18 20                        | 222 28                     | 3 28                            | E. Azim.             | ♀ — 8.    | 21 37                        | 66 48                      | 9 0                             | M. Azim.                   |
| ♂ — 20.     | 18 47                        | 224 11                     | 3 22                            | M. Azim.             | ♂ — 9.    | 21 58                        | 65 3                       | 8 46                            | M. Amp.                    |
| ♀ — 23.     | 19 1                         | 225 25                     | 2 7                             | E. Azim.             | ⊙ — 10.   | 22 49                        | 62 9                       | 11 0                            | E. Amp.                    |
| ♂ — 24.     | 20 22                        | 232 54                     | 0 0                             | M. Azim.             | ♂ — 11.   | 23 11                        | 61 42                      | 11 54                           | M. Azim.                   |
| ♂ — 24.     | 20 57                        | 235 56                     | 0 47                            | M. Azim.             | ♂ — 12.   | 23 17                        | 61 33                      | 12 16                           | E. Amp.                    |
| ♂ — 29.     | 20 54                        | 240 50                     | 0 52                            | Ditto.               | ♂ — 13.   | 23 33                        | 60 59                      | 12 40                           | M. Azim.                   |
| ♀ — 30.     | 18 50                        | 242 58                     | 0 37                            | Ditto.               | ♀ — 13.   | 23 57                        | 59 59                      | 14 0                            | M. Amp.                    |
| ⊙ Nov. 1.   | 18 0                         | 243 21                     | 1 18                            | E. Azim.             | ♂ — 14.   | 23 59                        | 59 57                      | 13 7                            | M. Azim.                   |
| ♂ — 1.      | 15 2                         | 244 52                     | 0 0                             | M. Azim.             | ♀ — 14.   | 24 40                        | 58 28                      | 14 0                            | Ditto.                     |
| ♂ — 1.      | 14 19                        | 245 11                     | 0 12                            | E. Azim.             | ♀ — 15.   | 25 20                        | 57 6                       | 15 30                           | M. Amp.                    |
| ♂ — 2.      | 13 2                         | 245 45                     | 0 25                            | M. Azim.             | ♂ — 16.   | 26 48                        | 54 31                      | 17 6                            | E. Amp.                    |
| ♀ — 4.      | 10 3                         | 248 18                     | 0 24                            | E. Azim.             | ⊙ — 17.   | 27 23                        | 53 48                      | 17 44                           | M. Azim.                   |
| ♂ — 5.      | 9 51                         | 248 35                     | 0 44                            | M. Amp.              | ♂ — 18.   | 27 38                        | 53 26                      | 19 14                           | E. Amp.                    |
| ♀ — 5.      | 9 50                         | 248 37                     | 0 0                             | M. Azim.             | ♂ — 18.   | 27 48                        | 53 11                      | 18 17                           | M. Azim.                   |
| ♀ — 6.      | 9 8                          | 251 53                     | 0 0                             | E. Azim.             | ♂ — 19.   | 28 18                        | 52 6                       | 20 17                           | E. Amp.                    |
| ⊙ — 8.      | 7 23                         | 253 29                     | 0 46                            | M. Azim.             | ♂ — 19.   | 28 53                        | 51 18                      | 20 40                           | M. Amp.                    |
| ♂ — 9.      | 6 0                          | 254 1                      | 0 49                            | M. Amp.              | ♀ — 20.   | 30 18                        | 48 39                      | 21 6                            | M. Azim.                   |
| ♂ — 10.     | 5 27                         | 254 11                     | 0 8                             | M. Azim.             | ♂ — 20.   | 30 45                        | 47 56                      | 21 40                           | E. Azim.                   |
| ♀ — 11.     | 5 12                         | 254 19                     | 0 16                            | E. Azim.             | ♂ — 21.   | 30 48                        | 47 52                      | 23 30                           | E. Amp.                    |
| ♂ — 11.     | 4 56                         | 254 21                     | 0 0                             | M. Azim.             | ♂ — 21.   | 31 28                        | 46 44                      | 23 30                           | M. Amp.                    |
| ♂ — 12.     | 4 40                         | 254 27                     | 0 0                             | Ditto.               | ♂ — 21.   | 31 31                        | 46 39                      | 23 16                           | M. Azim.                   |
| ♀ — 26.     | 3 58                         | 253 37                     | 1 20                            | E. Azim.             | ♂ — 21.   | 31 31                        | 46 39                      | 23 32                           | Ditto, by another Compass. |
| ♂ — 29.     | 5 11                         | 253 6                      | 1 31                            | Ditto.               | ♂ — 25.   | 34 24                        | 36 43                      | 24 0                            | E. Azim.                   |
| ♂ Dec. 12.  | 6 5                          | 106 5                      | 1 25                            | M. Azim.             | ♂ — 26.   | 34 16                        | 36 27                      | 25 15                           | M. Amp.                    |
| ⊙ — 27.     | 15 12                        | 94 54                      | 3 27                            | E. Azim.             | ♂ — 26.   | 34 16                        | 36 27                      | 25 10                           | M. Azim.                   |
| ♂ — 28.     | 15 43                        | 93 5                       | 0 0                             | M. Azim.             | ♂ — 26.   | 34 15                        | 36 21                      | 23 36                           | E. Azim.                   |
| ♂ — 29.     | 16 50                        | 90 6                       | 0 45                            | Ditto.               | ♂ — 26.   | 34 15                        | 36 20                      | 24 1                            | E. Amp.                    |
| ♀ — 30.     | 17 30                        | 87 22                      | 1 0                             | M. Amp.              | ♀ — 27.   | 34 14                        | 36 9                       | 23 30                           | M. Amp.                    |
| ♀ — 30.     | 17 46                        | 85 54                      | 1 42                            | E. Amp.              | ♀ — 27.   | 34 15                        | 35 50                      | 23 26                           | E. Azim.                   |
| ♂ — 31.     | 18 5                         | 84 6                       | 1 24                            | M. Azim.             | ♂ — 28.   | 34 15                        | 35 48                      | 23 42                           | E. Amp.                    |
| 1768.       |                              |                            |                                 |                      | ♂ — 28.   | 34 38                        | 33 35                      | 25 9                            | M. Azim.                   |
| ♀ Jan. 1.   | 18 43                        | 81 55                      | 2 40                            | Ditto.               | ♀ — 29.   | 34 40                        | 31 54                      | 23 24                           | E. Amp.                    |
| ♂ — 2.      | 19 21                        | 79 0                       | 3 10                            | M. Azim.             | ♀ — 29.   | 34 50                        | 29 8                       | 24 20                           | E. Azim.                   |
| ⊙ — 3.      | 20 25                        | 75 25                      | 4 0                             | E. Amp.              | ♀ — 30.   | 34 50                        | 29 1                       | 25 10                           | E. Amp.                    |
| ♂ — 4.      | 20 42                        | 75 1                       | 4 0                             | M. Amp.              | ♂ — 30.   | 34 56                        | 26 52                      | 24 14                           | M. Amp.                    |
| ♂ — 5.      | 21 3                         | 72 54                      | 5 39                            | M. Azim.             | ♂ — 30.   | 34 48                        | 26 40                      | 23 57                           | M. Azim.                   |
|             |                              |                            |                                 |                      | ♂ — 30.   | 34 28                        | 24 59                      | 23 50                           | E. Azim.                   |
|             |                              |                            |                                 |                      | ♂ — 31.   | 34 26                        | 24 48                      | 24 0                            | E. Amp.                    |
|             |                              |                            |                                 |                      | ⊙ — 31.   | 34 28                        | 24 7                       | 20 54                           | M. Azim.                   |
|             |                              |                            |                                 |                      | ♂ Feb. 1. | 34 37                        | 23 30                      | 22 30                           | E. Amp.                    |
|             |                              |                            |                                 |                      | ♂ — 2.    | 34 38                        | 23 0                       | 23 0                            | M. Amp.                    |
|             |                              |                            |                                 |                      |           | 34 38                        | 22 54                      | 22 20                           | M. Azim.                   |

# VARIATIONS OF THE COMPASS.

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| 18.                              | Latitude of the Ship. South. | Longitude of the Ship. East. | Variation of the Compaſs. Weſt. | Time when and Means. | 1768.        | Latitude of the Ship. South. | Longitude of the Ship. Weſt. | Variation of the Compaſs. Weſt. | Time when and Means. |
|----------------------------------|------------------------------|------------------------------|---------------------------------|----------------------|--------------|------------------------------|------------------------------|---------------------------------|----------------------|
| 3.                               | 34 38                        | 21 12                        | 21 45                           | M. Azim.             | Mar. 27.     | 0 58                         | 20 21                        | 9 16                            | M. Amp.              |
|                                  | 35 0                         | 19 47                        | 20 0                            | E. Azim.             |              | 0 53                         | 20 24                        | 8 6                             | M. Azim.             |
|                                  | 35 1                         | 19 40                        | 21 0                            | E. Amp.              |              | 0 20                         | 20 43                        | 7 29                            | E. Azim.             |
| 4 — 4.                           | 34 42                        | 18 36                        | 21 0                            | M. Amp.              |              | 0 16                         | 20 47                        | 7 31                            | E. Amp.              |
| In Table Bay, Cape of Good Hope. |                              |                              |                                 |                      | North.       |                              |                              |                                 |                      |
|                                  |                              |                              | 19 25                           | Azimuth.             | 28.          | 0 52                         | 21 37                        | 8 20                            | E. Azim.             |
| 1/2 Mar. 5.                      | 33 10                        | 17 22                        | 19 34                           | M. Amp.              |              | 0 56                         | 21 39                        | 8 50                            | E. Amp.              |
|                                  | 32 36                        | 16 29                        | 18 9                            | E. Azim.             | 30.          | 2 20                         | 22 33                        | 8 17                            | E. Azim.             |
|                                  | 32 32                        | 16 23                        | 18 33                           | E. Amp.              | 1/2 April 2. | 5 41                         | 24 13                        | 5 30                            | Ditto.               |
| 0 — 6.                           | 31 45                        | 15 21                        | 19 2                            | M. Amp.              |              | 5 43                         | 24 18                        | 4 10                            | E. Amp.              |
|                                  | 31 42                        | 15 15                        | 18 54                           | M. Azim.             | 3.           | 6 22                         | 25 21                        | 5 25                            | M. Amp.              |
|                                  | 31 12                        | 14 29                        | 17 56                           | E. Azim.             |              | 6 25                         | 25 26                        | 5 30                            | M. Azim.             |
| 3 — 8.                           | 27 4                         | 9 21                         | 15 18                           | Ditto.               |              | 6 56                         | 25 50                        | 3 46                            | E. Azim.             |
|                                  | 27 4                         | 9 21                         | 16 24                           | Ditto.               | 4.           | 7 42                         | 27 27                        | 5 21                            | M. Azim.             |
|                                  | 27 0                         | 9 15                         | 16 0                            | E. Amp.              |              | 8 14                         | 28 10                        | 5 20                            | E. Azim.             |
| 4 — 9.                           | 25 51                        | 8 27                         | 16 34                           | M. Azim.             | 5.           | 8 58                         | 29 29                        | 4 12                            | M. Azim.             |
|                                  | 25 7                         | 7 32                         | 15 54                           | E. Azim.             | 6.           | 11 25                        | 31 22                        | 4 48                            | E. Azim.             |
| 4 — 10.                          | 23 41                        | 6 10                         | 15 57                           | M. Azim.             |              | 11 32                        | 31 27                        | 4 13                            | E. Amp.              |
|                                  | 23 4                         | 5 17                         | 15 19                           | E. Azim.             | 7.           | 12 34                        | 32 3                         | 4 15                            | M. Amp.              |
| 2 — 11.                          | 22 3                         | 3 53                         | 14 28                           | M. Azim.             | 8.           | 14 46                        | 33 0                         | 4 14                            | Ditto.               |
| 1/2 — 12.                        | 20 7                         | 1 26                         | 14 29                           | Ditto.               | 9.           | 18 0                         | 34 24                        | 4 30                            | E. Azim.             |
| 0 — 13.                          | 19 29                        | 0 32                         | 14 0                            | E. Azim.             | 10.          | 19 30                        | 34 23                        | 5 0                             | M. Amp.              |
|                                  |                              | West.                        |                                 |                      |              | 20 27                        | 34 17                        | 4 30                            | E. Azim.             |
| 3 — 15.                          | 16 48                        | 1 32                         | 13 28                           | M. Azim.             | 11.          | 21 12                        | 34 29                        | 6 4                             | M. Amp.              |
|                                  | 16 20                        | 3 7                          | 12 33                           | E. Azim.             |              | 21 51                        | 34 48                        | 5 26                            | E. Amp.              |
|                                  | 16 18                        | 3 11                         | 13 7                            | E. Amp.              | 12.          | 22 19                        | 35 22                        | 6 0                             | M. Amp.              |
| 4 — 16.                          | 16 6                         | 4 22                         | 12 41                           | M. Amp.              |              | 22 23                        | 35 25                        | 6 40                            | M. Azim.             |
|                                  | 16 6                         | 4 27                         | 13 2                            | M. Azim.             |              | 22 35                        | 35 37                        | 4 35                            | E. Azim.             |
|                                  | 16 4                         | 5 19                         | 12 47                           | E. Azim.             | 13.          | 22 58                        | 35 38                        | 6 10                            | M. Azim.             |
| 1/2 — 19.                        | 14 36                        | 7 18                         | 11 41                           | E. Amp.              | 14.          | 24 28                        | 35 0                         | 7 0                             | M. Amp.              |
| 0 — 20.                          | 13 41                        | 8 16                         | 11 18                           | M. Azim.             |              | 24 42                        | 34 37                        | 7 40                            | E. Azim.             |
|                                  | 12 50                        | 9 10                         | 11 30                           | E. Amp.              | 15.          | 25 9                         | 35 29                        | 7 51                            | M. Azim.             |
| 1/2 — 21.                        | 11 59                        | 10 13                        | 11 0                            | M. Amp.              |              | 25 26                        | 35 37                        | 7 26                            | E. Azim.             |
|                                  | 10 57                        | 11 17                        | 10 0                            | E. Amp.              | 16.          | 26 12                        | 35 39                        | 8 44                            | M. Azim.             |
| 3 — 22.                          | 10 9                         | 12 13                        | 10 34                           | M. Amp.              | 17.          | 28 40                        | 34 55                        | 9 40                            | E. Azim.             |
|                                  | 9 16                         | 13 9                         | 11 43                           | E. Azim.             |              | 28 44                        | 34 52                        | 9 41                            | E. Amp.              |
| 4 — 23.                          | 8 5                          | 14 3                         | 9 53                            | M. Azim.             | 18.          | 29 37                        | 34 24                        | 11 4                            | M. Azim.             |
|                                  | 7 19                         | 14 59                        | 9 48                            | E. Azim.             |              | 30 16                        | 34 4                         | 10 52                           | E. Azim.             |
| 4 — 24.                          | 5 48                         | 15 51                        | 9 30                            | M. Amp.              | 19.          | 32 1                         | 33 14                        | 10 18                           | Ditto.               |
|                                  | 5 7                          | 16 44                        | 10 0                            | E. Azim.             | 20.          | 33 20                        | 32 25                        | 11 32                           | M. Azim.             |
| 2 — 25.                          | 4 8                          | 17 49                        | 10 9                            | M. Azim.             | 21.          | 34 38                        | 31 21                        | 11 34                           | Ditto.               |
|                                  | 3 28                         | 18 5                         | 9 9                             | E. Azim.             | 22.          | 36 19                        | 28 26                        | 11 8                            | E. Azim.             |
|                                  | 3 24                         | 18 7                         | 8 20                            | E. Amp.              |              | 36 23                        | 28 22                        | 11 13                           | E. Amp.              |
| 1/2 — 26.                        | 2 29                         | 18 49                        | 10 8                            | M. Azim.             | 23.          | 36 42                        | 27 38                        | 16 33                           | M. Azim.             |
|                                  | 1 45                         | 19 31                        | 7 53                            | E. Azim.             | 25.          | 28 47                        | 28 31                        | 19 19                           | M. Amp.              |

## VARIATIONS OF THE COMPASS.

| 1768.       | Latitude of<br>the Ship.<br>North. | Longit. of<br>the Ship.<br>West. | Variation<br>of the<br>Compass.<br>West. | Time when<br>and<br>Means. | 1768.    | Latitude of<br>the Ship.<br>North. | Longit. of<br>the Ship.<br>West. | Variation<br>of the<br>Compass.<br>West. | Time when<br>and<br>Means. |
|-------------|------------------------------------|----------------------------------|--|----------------------------|----------|------------------------------------|----------------------------------|--|----------------------------|
|             | ° ' "                              | ° ' "                            | ° ' "                                    |                            |          | ° ' "                              | ° ' "                            | ° ' "                                    |                            |
| ▷ April 25. | 28 53                              | 28 31                            | 17 57                                    | M. Azim.                   | ▷ May 9. | 49 47                              | 7 41                             | 23 6                                     | E. Azim.                   |
|             | 39 21                              | 28 16                            | 20 0                                     | E. Amp.                    |          | 49 39                              | 7 41                             | 23 0                                     | E. Amp.                    |
| ♂ — 26.     | 39 24                              | 29 21                            | 18 49                                    | M. Amp.                    | ♂ — 10.  | 49 33                              | 7 43                             | 20 32                                    | M. Amp.                    |
|             | 39 24                              | 29 21                            | 18 52                                    | E. Amp.                    |          | 49 40                              | 7 38                             | 19 51                                    | M. Azim.                   |
| ♀ — 27.     | 39 46                              | 28 42                            | 17 30                                    | M. Amp.                    | ♀ — 12.  | 49 35                              | 7 7                              | 21 6                                     | Ditto.                     |
|             | 40 25                              | 27 45                            | 14 15                                    | E. Amp.                    |          | 49 54                              | 7 12                             | 19 46                                    | E. Azim.                   |
| ♂ — 28.     | 41 40                              | 25 3                             | 15 49                                    | E. Azim.                   |          | 49 53                              | 7 10                             | 19 22                                    | E. Amp.                    |
| ♂ — 30.     | 41 59                              | 21 57                            | 16 47                                    | M. Azim.                   | ♀ — 13.  | 49 56                              | 6 46                             | 19 47                                    | M. Amp.                    |
| ⊙ May 1.    | 42 37                              | 21 11                            | 23 40                                    | E. Azim.                   |          | 49 45                              | 6 40                             | 21 33                                    | E. Azim.                   |
| ♂ — 5.      | 43 22                              | 14 7                             | 16 57                                    | Ditto.                     | ♂ — 14.  | 49 40                              | 6 35                             | 20 00                                    | Ditto.                     |
|             | 43 29                              | 14 5                             | 19 0                                     | E. Amp.                    |          | 49 40                              | 6 35                             | 20 10                                    | E. Amp.                    |
| ♀ — 6.      | 44 46                              | 13 0                             | 18 16                                    | M. Azim.                   | ⊙ — 15.  | 49 43                              | 5 25                             | 20 00                                    | M. Amp.                    |
| ⊙ — 8.      | 48 58                              | 8 51                             | 18 0                                     | M. Amp.                    |          | 49 43                              | 5 26                             | 20 20                                    | M. Azim.                   |
|             | 50 0                               | 7 44                             | 16 45                                    | E. Azim.                   |          | 49 51                              | 5 18                             | 19 45                                    | E. Amp.                    |
| ▷ — 9.      | 50 3                               | 7 38                             | 17 27                                    | M. Azim.                   |          |                                    |                                  |  |                            |

A T A B L E

A  
T A B L E

OF THE  
V A R I A T I O N S   O F   T H E   C O M P A S S ,

Observed on Board His MAJESTY's Sloop, the SWALLOW,  
In her VOYAGE Round the WORLD,

UNDER THE COMMAND OF

P H I L I P   C A R T E R E T, Esq.





# VARIATIONS OF THE COMPASS.

83

| 1766.      | Latitude of the Ship. North. | Longit. of the Ship. West. | Variation of the Compaſs. Weſt. | Time when and Means. | 1767.       | Latitude of the Ship. South. | Longit. of the Ship. Weſt. | Variation of the Compaſs. Eaſt. | Time when and Means. |
|------------|------------------------------|----------------------------|---------------------------------|----------------------|-------------|------------------------------|----------------------------|---------------------------------|----------------------|
| h Aug. 30. | 45 12                        | 8 0                        | 20 25                           | E. Azim.             | h Dec. 6.   | 47 47                        | 64 29                      | 20 37                           | M. Azim.             |
| h Sept. 3. | 38 38                        | 11 35                      | 19 6                            | Ditto.               | o — 7.      | 47 24                        | 65 30                      | 19 40                           | M. Amp.              |
| h — 4.     | 37 29                        | 11 55                      | 20 17                           | M. Azim.             | h — 8.      | 48 6                         | 66 40                      | 20 30                           | E. Azim.             |
| h — 18.    | 21 32                        | 20 13                      | 9 20                            | E. Azim.             | h — 9.      | 49 5                         | 67 10                      | 20 35                           | M. Azim.             |
| h — 19.    | 20 0                         | 21 8                       | 12 17                           | M. Azim.             | h — 18.     |                              |                            | 23 10                           | Point Poſſeſ-        |
|            | 19 17                        | 21 30                      | 9 14                            | E. Azim.             | 1767.       |                              |                            |                                 |                      |
| o — 21.    | 17 17                        | 22 22                      | 10 14                           | M. Azim.             | h April 18. | 49 2                         | 78 44                      | 19 36                           | E. Azim.             |
| h — 22.    | 16 17                        | 22 50                      | 7 53                            | E. Azim.             | h — 20.     | 48 12                        | 80 24                      | 17 26                           | M. Azim.             |
| h — 23.    | 15 12                        | 23 8                       | 8 30                            | M. Azim.             | o — 26.     | 45 36                        | 80 26                      | 18 17                           | E. Amp.              |
| h Octo. 2. | 10 22                        | 23 41                      | 8 42                            | M. Amp.              | h — 28.     | 44 13                        | 80 16                      | 15 10                           | Ditto.               |
| h — 4.     | 9 39                         | 23 48                      | 7 0                             | Ditto.               | h May 10.   | 33 38                        | 78 30                      | 11 0                            | E. Azim.             |
| h — 10.    | 6 25                         | 23 51                      | 6 30                            | E. Amp.              | h — 14.     | 33 42                        | 80 34                      | 11 0                            | Ditto.               |
| h — 11.    | 5 58                         | 24 9                       | 5 35                            | E. Amp.              | h — 15.     | 33 42                        | 80 34                      | 10 20                           | Ditto.               |
| h — 22.    | 0 0                          | 24 9                       | 6 5                             | E. Azim.             | h — 28.     | 29 36                        | 80 00                      | 9 40                            | Ditto.               |
|            | South.                       | 25 30                      | 6 20                            | M. Azim.             | h — 29.     | 28 52                        | 80 13                      | 10 10                           | Ditto.               |
| h — 25.    | 4 42                         | 28 42                      | 4 34                            | E. Amp.              | o — 31.     | 26 11                        | 82 22                      | 8 10                            | Ditto.               |
| h — 28.    | 9 15                         | 30 54                      | 1 50                            | E. Azim.             | h June 1.   | 25 51                        | 84 40                      | 8 8                             | Ditto.               |
| h — 30.    | 9 23                         | 30 57                      | 1 16                            | E. Amp.              | o — 7.      | 27 23                        | 97 18                      | 5 45                            | Ditto.               |
|            | 11 21                        | 32 2                       | 0 30                            | E. Azim.             | h — 8.      | 27 23                        | 97 34                      | 5 45                            | M. Azim.             |
| h — 31.    | 13 23                        | 32 49                      | 1 12                            | E. Azim.             | h — 10.     | 26 26                        | 97 55                      | 5 40                            | M. Amp.              |
| h Nov. 7.  | 23 16                        | 39 55                      | 4 36                            | M. Amp.              | h — 12.     | 26 56                        | 100 34                     | 4 13                            | E. Azim.             |
|            | 23 21                        | 39 58                      | 5 36                            | M. Azim.             | h — 16.     | 28 10                        | 111 23                     | 2 0                             | Ditto.               |
|            | 23 48                        | 40 17                      | 6 0                             | E. Azim.             | h — 17.     | 28 6                         | 112 11                     | 1 23                            | M. Amp.              |
|            | 23 53                        | 40 20                      | 5 52                            | E. Amp.              | h — 18.     | 28 8                         | 112 11                     | 1 51                            | M. Azim.             |
| h — 8.     | 25 47                        | 41 48                      | 6 23                            | E. Azim.             | h — 20.     | 28 6                         | 113 58                     | 2 50                            | E. Azim.             |
|            | 25 53                        | 41 51                      | 6 55                            | E. Amp.              | h — 30.     | 25 57                        | 130 49                     | 2 32                            | E. Azim.             |
| h — 14.    | 32 58                        | 44 14                      | 11 55                           | M. Azim.             | h July 2.   | 24 55                        | 134 00                     | 2 46                            | Ditto.               |
| o — 16.    | 34 35                        | 49 25                      | 12 36                           | Ditto.               | h — 4.      | 25 28                        | 136 53                     | 3 43                            | M. Azim.             |
| h — 17.    | 34 39                        | 50 12                      | 14 0                            | M. Amp.              | o — 5.      | 24 56                        | 137 11                     | 5 24                            | Ditto.               |
|            | 34 41                        | 50 12                      | 13 3                            | M. Azim.             | h — 6.      | 24 36                        | 138 00                     | 4 16                            | Ditto.               |
|            | 34 45                        | 50 13                      | 14 20                           | E. Azim.             | h — 7.      | 24 11                        | 139 38                     | 5 12                            | Ditto.               |
| h — 18.    | 35 22                        | 51 18                      | 14 22                           | M. Azim.             | h — 8.      | 24 10                        | 139 43                     | 4 2                             | E. Azim.             |
|            | 35 51                        | 51 47                      | 15 47                           | E. Azim.             | h — 10.     | 23 48                        | 139 43                     | 4 37                            | M. Amp.              |
| h — 20.    | 37 20                        | 53 30                      | 15 33                           | E. Amp.              | h — 12.     | 22 17                        | 140 20                     | 5 16                            | M. Azim.             |
| h — 24.    | 40 46                        | 56 8                       | 18 2                            | E. Azim.             | o — 13.     | 20 36                        | 144 57                     | 4 20                            | E. Azim.             |
| h — 28.    | 41 9                         | 58 41                      | 19 0                            | M. Azim.             | h — 15.     | 21 0                         | 148 52                     | 5 46                            | E. Azim.             |
|            | 41 18                        | 58 37                      | 19 0                            | E. Azim.             | h — 16.     | 21 40                        | 150 21                     | 6 12                            | M. Amp.              |
| h — 29.    | 41 55                        | 60 3                       | 19 2                            | M. Azim.             | h — 19.     | 21 40                        | 150 21                     | 6 35                            | M. Azim.             |
|            | 42 18                        | 61 0                       | 18 5                            | E. Azim.             | h — 20.     | 22 2                         | 151 2                      | 6 33                            | E. Azim.             |
| h Dec. 1.  | 43 51                        | 60 50                      | 19 10                           | M. Azim.             | o — 19.     | 19 48                        | 154 4                      | 6 8                             | E. Amp.              |
| h — 4.     | 47 13                        | 63 21                      | 20 25                           | E. Amp.              | h — 20.     | 19 6                         | 156 19                     | 7 0                             | Ditto.               |
| h — 5.     | 47 51                        | 63 26                      | 20 46                           | M. Azim.             |             |                              |                            |                                 |                      |

tion W. N. W.  $\frac{1}{2}$  W. true, diſtant 5 miles.

## VARIATIONS OF THE COMPASS.

| 1767.       | Latitude of the Ship. South. | Longit. of the Ship. West. | Variation of the Compass. East. | Time when and Means. | 1767.       | Latitude of the Ship. North. | Longit. of the Ship. West. | Variation of the Compass. East. | Time when and Means. |
|-------------|------------------------------|----------------------------|---------------------------------|----------------------|-------------|------------------------------|----------------------------|---------------------------------|----------------------|
| ♂ July 21.  | 18 35                        | 158 41                     | 7 38                            | E. Azim.             | ♀ Sept. 30. | 4 18                         | 225 18                     | 1 41                            | M. Amp.              |
| 4 — 23.     | 15 58                        | 162 34                     | 6 5                             | Ditto.               | ⊙ Octo. 4.  | 4 33                         | 228 8                      | 3 48                            | Ditto.               |
| ♀ — 24.     | 13 55                        | 163 37                     | 6 29                            | Ditto.               | ♂ — 5.      | 4 34                         | 228 16                     | 3 10                            | E. Azim.             |
| h — 25.     | 12 37                        | 164 23                     | 9 30                            | M. Azim.             | ♂ — 6.      | 4 18                         | 228 8                      | 3 33                            | M. Azim.             |
| ⊙ — 26.     | 11 49                        | 164 53                     | 10 58                           | E. Azim.             | 4 — 8.      | 3 56                         | 226 45                     | 3 53                            | Ditto.               |
| ♂ — 28.     | 10 30                        | 166 27                     | 9 0                             | M. Azim.             |             | 3 53                         | 226 44                     | 3 11                            | E. Azim.             |
| 4 — 30.     | 9 52                         | 170 48                     | 9 4                             | Ditto.               | ♀ — 9.      | 4 3                          | 226 48                     | 3 45                            | E. Azim.             |
| h Aug. 1.   | 9 51                         | 175 53                     | 8 50                            | E. Azim.             | ♂ — 12.     | 4 58                         | 227 18                     | 2 6                             | Ditto.               |
| ⊙ — 2.      | 9 53                         | 179 2                      | 10 4                            | M. Azim.             |             | 4 59                         | 227 19                     | 2 32                            | E. Amp.              |
|             | 9 58                         | 179 40                     | 9 22                            | E. Azim.             | ♂ — 13.     | 5 22                         | 227 41                     | 2 15                            | E. Azim.             |
|             | 10 6                         | 180 38                     | 10 30                           | M. Azim.             |             | 5 23                         | 227 43                     | 2 25                            | E. Amp.              |
|             | 10 12                        | 181 6                      | 9 8                             | E. Azim.             | ♀ — 16.     | 5 58                         | 227 52                     | 2 34                            | Ditto.               |
|             | 10 12                        | 181 10                     | 9 17                            | E. Amp.              | h — 17.     | 6 14                         | 228 35                     | 2 20                            | Ditto.               |
| ♂ — 3.      | 10 16                        | 181 44                     | 11 23                           | M. Azim.             | ⊙ — 25.     | 8 10                         | 231 40                     | 4 34                            | M. Azim.             |
|             | 10 19                        | 182 4                      | 9 13                            | E. Azim.             | ♀ — 28.     | 6 34                         | 233 43                     | 2 10                            | Ditto.               |
| ♂ — 4.      | 10 21                        | 182 32                     | 10 45                           | M. Amp.              | 4 — 29.     | 6 18                         | 233 24                     | 1 45                            | Ditto.               |
|             | 10 21                        | 182 33                     | 10 50                           | M. Azim.             | ♀ — 30.     | 5 50                         | 234 13                     | 1 38                            | E. Azim.             |
|             | 10 23                        | 182 45                     | 10 54                           | E. Azim.             | ♂ Nov. 3.   | 5 26                         | 234 0                      | 1 20                            | Ditto.               |
|             | 10 23                        | 182 46                     | 10 39                           | E. Amp.              | ♀ — 6.      | 5 34                         | 235 4                      | 0 48                            | M. Amp.              |
| ♀ — 5.      | 10 36                        | 184 22                     | 10 52                           | Ditto.               |             | 5 34                         | 235 4                      | 0 58                            | E. Azim.             |
| ♀ — 7.      | 10 53                        | 187 40                     | 11 2                            | E. Azim.             |             | 5 34                         | 235 4                      | 0 40                            | E. Amp.              |
|             | 10 53                        | 187 43                     | 11 32                           | E. Amp.              | h — 7.      | 5 36                         | 235 29                     | 0 39                            | Ditto.               |
| h — 8.      | 11 2                         | 188 37                     | 10 27                           | Ditto.               | ⊙ — 8.      | 5 31                         | 236 10                     | 0 58                            | Ditto.               |
| ⊙ — 9.      | 10 56                        | 188 43                     | 9 37                            | M. Amp.              | h — 14.     | 1 58                         | 238 45                     | 0 6                             | M. Amp.              |
|             | 10 56                        | 188 43                     | 10 2                            | M. Azim.             |             |                              |                            | West.                           |                      |
| ♂ — 11.     | 10 47                        | 193 23                     | 10 38                           | E. Azim.             | ⊙ — 22.     | 1 36                         | 241 14                     | 0 36                            | E. Azim.             |
| h — 18.     | 9 48                         | 197 16                     | 8 38                            | Ditto.               | 4 — 26.     | 0 0                          | 243 2                      | 0 19                            | Ditto.               |
| ♀ — 19.     | 8 42                         | 199 8                      | 8 30                            | Ditto.               |             | 0 0                          | 243 3                      | 0 12                            | E. Amp.              |
| 4 — 20.     | 8 4                          | 200 30                     | 8 31                            | M. Azim.             |             | South.                       |                            |                                 |                      |
| ♀ — 21.     | 7 44                         | 201 12                     | 7 42                            | E. Azim.             | ♂ Dec. 7.   | 3 24                         | 244 16                     | 0 22                            | M. Amp.              |
| h — 22.     | 6 14                         | 202 36                     | 7 42                            | Ditto.               |             | 3 25                         | 244 17                     | 0 32                            | M. Azim.             |
| ♂ — 24.     | 4 58                         | 205 0                      | 6 25                            | Ditto.               |             |                              |                            |                                 |                      |
| ♀ — 26.     | 4 53                         | 206 44                     | 7 14                            | Ditto.               | 1768.       |                              |                            |                                 |                      |
| ♂ Sept. 16. | 2 20                         | 214 47                     | 6 30                            | M. Azim.             | ⊙ Jan. 31.  | In Bonthain Bay.             |                            | 1 18                            | M. Azim.             |
| h — 19.     | 2 0                          | 216 45                     | 5 25                            | M. Amp.              | ⊙ May 29.   | 5 29                         | 249 18                     | 0 56                            | E. Amp.              |
|             | 2 0                          | 216 48                     | 5 28                            | M. Azim.             |             |                              | East.                      |                                 |                      |
| ⊙ — 20.     | 1 32                         | 217 16                     | 4 31                            | E. Azim.             | ♀ Sept. 30. | 8 0                          | 102 32                     | 0 51                            | E. Azim.             |
|             | 1 32                         | 217 18                     | 4 40                            | E. Amp.              | ⊙ Octo. 2.  | 10 45                        | 99 17                      | 2 6                             | Ditto.               |
| ♂ — 22.     | 0 40                         | 220 53                     | 4 30                            | Ditto.               | ♂ — 4.      | 12 22                        | 94 50                      | 3 12                            | Ditto.               |
| ♀ — 23.     | 0 4                          | 221 44                     | 4 17                            | E. Azim.             | ♂ — 10.     | 18 6                         | 81 48                      | 2 15                            | Ditto.               |
|             | North.                       |                            |                                 |                      | ♂ — 11.     | 19 6                         | 79 30                      | 4 30                            | Ditto.               |
| 4 — 24.     | 0 7                          | 222 2                      | 3 6                             | E. Azim.             | ♀ — 12.     | 20 0                         | 77 4                       | 3 30                            | Ditto.               |
|             | 0 7                          | 222 4                      | 3 10                            | E. Amp.              | ♀ — 14.     | 22 2                         | 73 4                       | 6 26                            | Ditto.               |
| h — 26.     | 1 36                         | 223 42                     | 1 34                            | E. Azim.             | h — 15.     | 23 5                         | 71 10                      | 8 9                             | Ditto.               |
| ⊙ — 27.     | 2 19                         | 224 8                      | 2 9                             | Ditto.               | ⊙ — 16.     | 23 35                        | 69 20                      | 9 34                            | Ditto.               |

# VARIATIONS OF THE COMPASS.

85

| 8.        | Latitude of the Ship. South. | Longit. of the Ship. East. | Variation of the Compass. West. | Time when and Means. | 1768.     | Latitude of the Ship. South. | Longit. of the Ship. East. | Variation of the Compass. West. | Time when and Means. |
|-----------|------------------------------|----------------------------|---------------------------------|----------------------|-----------|------------------------------|----------------------------|---------------------------------|----------------------|
| Octo. 17. | 24 30                        | 68 24                      | 11 20                           | E. Azim.             | Nov. 27.  | 35 6                         | 18 30                      | 21 38                           | E. Azim.             |
| ♂ — 18.   | 25 5                         | 67 51                      | 11 50                           | Ditto.               | 1769.     |                              |                            |                                 |                      |
| ♀ — 19.   | 25 4                         | 67 31                      | 12 49                           | Ditto.               | Jan. 9.   | 30 12                        | 12 16                      | 19 21                           | E. Azim.             |
| ♂ — 20.   | 25 0                         | 67 16                      | 12 54                           | M. Azim.             | ♀ — 11.   | 26 25                        | 8 10                       | 17 2                            | Ditto.               |
| ♂ — 21.   | 24 55                        | 66 49                      | 11 53                           | E. Azim.             | ♂ — 14.   | 22 4                         | 4 48                       | 16 19                           | Ditto.               |
| ♂ — 22.   | 25 7                         | 65 47                      | 12 48                           | Ditto.               | ♂ — 15.   | 20 49                        | 2 41                       | 16 31                           | Ditto.               |
| ♂ — 23.   | 24 51                        | 65 48                      | 11 25                           | M. Azim.             |           |                              | West.                      |                                 |                      |
| ♂ — 24.   | 24 36                        | 65 49                      | 12 53                           | E. Azim.             | ♀ — 18.   | 17 15                        | 0 38                       | 14 58                           | M. Azim.             |
| ♂ — 25.   | 23 44                        | 65 44                      | 11 33                           | Ditto.               |           | 16 51                        | 1 35                       | 14 38                           | E. Azim.             |
| ♂ — 26.   | 23 21                        | 64 24                      | 11 2                            | Ditto.               | ♂ — 19.   | 16 5                         | 3 28                       | 13 46                           | Ditto.               |
| ♂ — 27.   | 23 24                        | 63 28                      | 12 30                           | Ditto.               | ♂ — 22.   | 15 55                        | 5 49                       | 12 22                           | E. Amp.              |
| ♂ — 28.   | 23 24                        | 63 26                      | 12 50                           | E. Amp.              | ♀ — 25.   | 14 46                        | 6 59                       | 12 25                           | M. Azim.             |
| ♂ — 29.   | 23 30                        | 62 56                      | 13 42                           | M. Azim.             |           | 14 4                         | 7 39                       | 12 22                           | E. Azim.             |
| ♂ — 30.   | 23 36                        | 62 30                      | 13 0                            | E. Azim.             |           | 14 2                         | 7 42                       | 12 46                           | E. Amp.              |
| ♂ — 31.   | 24 15                        | 60 48                      | 15 45                           | Ditto.               | ♂ — 26.   | 12 38                        | 8 55                       | 11 48                           | E. Azim.             |
| ♀ — 32.   | 24 45                        | 60 21                      | 16 35                           | M. Azim.             |           | 12 35                        | 8 58                       | 11 46                           | E. Amp.              |
| ♂ — 33.   | 24 55                        | 59 56                      | 16 10                           | E. Azim.             | ♀ — 27.   | 11 21                        | 9 23                       | 11 45                           | E. Azim.             |
| ♂ — 34.   | 25 20                        | 58 0                       | 15 22                           | Ditto.               |           | 11 19                        | 9 25                       | 11 36                           | E. Amp.              |
| ♂ — 35.   | 25 55                        | 56 8                       | 18 18                           | Ditto.               | ♂ — 28.   | 10 11                        | 11 44                      | 10 46                           | E. Azim.             |
| ♂ — 36.   | 26 40                        | 53 57                      | 18 20                           | Ditto.               | ♂ Feb. 2. | 6 24                         | 15 33                      | 9 24                            | Ditto.               |
| ♂ Nov. 1. | 27 0                         | 52 45                      | 20 12                           | M. Azim.             |           | 6 21                         | 15 36                      | 9 45                            | E. Amp.              |
| ♂ — 2.    | 27 12                        | 52 10                      | 20 20                           | E. Azim.             | ♀ — 3.    | 4 42                         | 16 56                      | 9 04                            | E. Azim.             |
| ♂ — 3.    | 27 44                        | 50 43                      | 20 53                           | Ditto.               |           | 4 40                         | 16 58                      | 9 49                            | E. Amp.              |
| ♂ — 4.    | 27 40                        | 50 0                       | 21 23                           | Ditto.               | ♂ — 4.    | 3 47                         | 17 40                      | 9 18                            | M. Amp.              |
| ♂ — 5.    | 27 43                        | 49 8                       | 20 57                           | Ditto.               | ♂ — 5.    | 1 40                         | 19 9                       | 8 54                            | E. Azim.             |
| ♂ — 6.    | 27 43                        | 49 5                       | 21 15                           | E. Amp.              | ♂ — 6.    | 0 39                         | 19 38                      | 9 26                            | M. Azim.             |
| ♂ — 7.    | 27 50                        | 47 40                      | 21 9                            | E. Azim.             |           | 0 2                          | 20 10                      | 8 32                            | E. Azim.             |
| ♂ — 8.    | 29 10                        | 44 41                      | 22 38                           | Ditto.               |           | North.                       |                            |                                 |                      |
| ♂ — 9.    | 29 55                        | 42 58                      | 24 40                           | M. Azim.             | ♂ — 7.    | 1 2                          | 21 4                       | 8 37                            | E. Azim.             |
| ♂ — 10.   | 30 5                         | 42 31                      | 24 55                           | E. Azim.             | ♂ — 8.    | 1 48                         | 21 50                      | 8 22                            | M. Amp.              |
| ♂ — 11.   | 30 12                        | 41 12                      | 25 39                           | Ditto.               |           | 1 49                         | 21 51                      | 8 25                            | M. Azim.             |
| ♂ — 12.   | 30 15                        | 40 25                      | 25 50                           | M. Azim.             | ♀ — 10.   | 2 45                         | 23 13                      | 7 21                            | E. Azim.             |
| ♂ — 13.   | 30 22                        | 40 0                       | 25 10                           | E. Azim.             | ♀ — 15.   | 6 45                         | 26 44                      | 6 35                            | Ditto.               |
| ♂ — 14.   | 30 44                        | 39 2                       | 25 32                           | Ditto.               | ♂ — 16.   | 8 15                         | 27 35                      | 6 8                             | Ditto.               |
| ♂ — 15.   | 31 48                        | 37 39                      | 25 8                            | M. Azim.             |           | 8 15                         | 27 35                      | 6 10                            | E. Amp.              |
| ♂ — 16.   | 32 46                        | 35 2                       | 25 2                            | E. Azim.             | ♀ — 17.   | 9 40                         | 28 30                      | 5 4                             | E. Azim.             |
| ♂ — 17.   | 33 20                        | 33 15                      | 25 5                            | Ditto.               | ♂ — 19.   | 12 15                        | 29 20                      | 6 46                            | Ditto.               |
| ♂ — 18.   | 35 35                        | 26 16                      | 22 30                           | Ditto.               | ♂ — 26.   | 23 46                        | 32 52                      | 6 0                             | M. Azim.             |
| ♂ — 19.   | 35 17                        | 25 33                      | 22 32                           | Ditto.               | ♀ Mar. 3. | 33 50                        | 28 50                      | 13 26                           | E. Azim.             |
| ♂ — 20.   | 35 42                        | 25 10                      | 22 46                           | Ditto.               | ♂ — 4.    | 32 50                        | 28 10                      | 12 26                           | M. Amp.              |
| ♂ — 21.   | 35 45                        | 23 30                      | 22 18                           | Ditto.               |           | 33 50                        | 28 10                      | 13 43                           | M. Azim.             |
| ♂ — 22.   | 35 2                         | 22 46                      | 22 50                           | Ditto.               | ♂ — 5.    | 35 45                        | 27 35                      | 14 53                           | E. Azim.             |
| ♂ — 23.   | 34 53                        | 21 40                      | 21 15                           | Ditto.               | ♂ — 6.    | 36 55                        | 27 20                      | 15 15                           | M. Azim.             |
| ♂ — 24.   | 34 52                        | 21 38                      | 21 39                           | E. Amp.              |           | 36 58                        | 27 10                      | 14 58                           | E. Azim.             |
| ♂ — 25.   | 34 55                        | 21 19                      | 21 37                           | E. Azim.             | ♂ — 7.    | 38 15                        | 26 23                      | 13 36                           | Ditto.               |
| ♂ — 26.   | 34 55                        | 21 17                      | 21 52                           | E. Amp.              |           | 39 15                        | 25 12                      | 16 46                           | Ditto.               |



V A R I A T I O N S

OF THE

O M P A S S,

Observed on Board His MAJESTY's Bark, the ENDEAVOUR,  
In her VOYAGE Round the WORLD,

UNDER THE COMMAND OF

J A M E S C O O K, Esq.

IN THE YEARS 1768, 1769, 1770, and 1771.



# VARIATIONS OF THE COMPASS.

89

| 1768.    | Latitude of the Ship. North.                             | Longit. of the Ship. West. | Variation of the Compass. West. | Time when and Means.                | 1768.    | Latitude of the Ship. North. | Longit. of the Ship. West. | Variation of the Compass. West. | Time when and Means. |
|----------|--|----------------------------|---------------------------------|-------------------------------------|----------|------------------------------|----------------------------|---------------------------------|----------------------|
| Aug. 10. | 50 26  | Beachey Head N. 34° E.     | 23 0                            | M. Azim.                            | Octo. 8. | 8 39                         | 23 4                       | 7 47                            | M. Azim.             |
| Sept. 3. | 44 0   |                            | 16 0                            | E. Amp.                             |          | 8 39                         | 23 4                       | 8 12                            | Ditto.               |
| 4.       | Cape Finnisferre S. by W. $\frac{1}{2}$ W. dist. 6 leag. |                            | 18 42                           | E. Azim.                            | 9.       | 8 16                         | 23 3                       | 8 20                            | E. Azim.             |
| 6.       | 42 12  | 9 40                       | 19 30                           | E. Amp.                             |          | 8 16                         | 23 3                       | 8 23                            | Ditto.               |
| 7.       | 40 42  | 10 0                       | 21 40                           | M. Azim.                            |          | 8 6                          | 23 15                      | 7 48                            | M. Amp.              |
| 9.       | 37 10  | 11 33                      | 19 50                           | Ditto.                              |          | 7 59                         | 23 20                      | 8 57                            | E. Azim.             |
|          | 36 48  | 12 12                      | 20 48                           | E. Azim.                            | 12.      | 7 59                         | 23 20                      | 8 11                            | Ditto.               |
|          | 36 46  | 12 13                      | 21 50                           | E. Amp.                             |          | 7 59                         | 23 20                      | 8 58                            | Ditto.               |
| 10.      | 35 40  | 13 23                      | 20 50                           | M. Amp.                             |          | 7 59                         | 23 20                      | 8 29                            | E. Amp.              |
|          | 35 38  | 13 25                      | 20 28                           | M. Azim.                            | 13.      | 7 17                         | 23 50                      | 8 45                            | E. Azim.             |
|          | 35 4   | 14 05                      | 18 40                           | E. Azim.                            | 14.      | 7 17                         | 23 52                      | 8 53                            | E. Amp.              |
|          | 35 0   | 14 10                      | 19 8                            | E. Amp.                             | 15.      | 6 57                         | 23 45                      | 5 46                            | E. Azim.             |
| 11.      | 34 15  | 14 30                      | 17 53                           | M. Amp.                             | 16.      | 5 56                         | 23 45                      | 8 40                            | Ditto.               |
|          | 34 12  | 14 34                      | 18 3                            | M. Azim.                            | 17.      | 5 53                         | 23 45                      | 9 16                            | M. Azim.             |
|          | At Madeira.  |                            | 15 30                           | On Shore.                           | 18.      | 3 6                          | 26 40                      | 4 2                             | E. Azim.             |
| 19.      | 31 35  | 17 8                       | 16 30                           | E. Azim.                            | 19.      | 2 54                         | 27 5                       | 4 10                            | M. Azim.             |
| 21.      | 30 31  | 16 11                      | 17 50                           | Ditto.                              | 20.      | 2 54                         | 27 5                       | 4 4                             | Ditto.               |
| 22.      | 29 40  | 15 31                      | 17 30                           | By Azim when the ☉ had equal Altut. | 21.      | 1 58                         | 28 5                       | 3 13                            | M. Amp.              |
|          | 29 40  | 15 31                      | 17 0                            |                                     | 22.      | 1 58                         | 28 7                       | 3 21                            | M. Azim.             |
|          | 29 40  | 15 31                      | 17 15                           |                                     | 23.      | 1 21                         | 28 43                      | 3 22                            | Ditto.               |
|          | 29 28  | 15 38                      | 18 30                           | E. Amp.                             | 24.      | 0 2                          | 29 25                      | 2 16                            | Ditto.               |
| 23.      | 29 2   | 15 52                      | 16 30                           | M. Amp.                             |          | 0 2                          | 29 25                      | 2 33                            | Ditto.               |
|          | 29 0   | 15 55                      | 17 22                           | M. Azim.                            | 25.      | South.                       |                            |                                 |                      |
|          | 29 0   | 15 55                      | 16 30                           | Ditto.                              |          | 0 24                         | 29 36                      | 2 30                            | E. Azim.             |
| 24.      | 27 38  | 16 24                      | 15 46                           | M. Amp.                             | 26.      | 2 7                          | 30 58                      | 2 52                            | M. Azim.             |
|          | 27 32  | 16 30                      | 16 43                           | M. Azim.                            | 27.      | 2 7                          | 30 58                      | 2 44                            | Ditto.               |
|          | 26 54  | 17 18                      | 14 58                           | E. Amp.                             | 28.      | 3 56                         | 32 30                      | 2 25                            | E. Azim.             |
| 25.      | 25 18  | 18 55                      | 15 1                            | Ditto.                              | 29.      | 5 42                         | 32 52                      | 1 34                            | Ditto.               |
| 27.      | 20 56  | 20 25                      | 13 19                           | E. Azim.                            |          | 5 42                         | 32 52                      | 1 28                            | Ditto.               |
|          | 20 56  | 20 25                      | 12 13                           | Ditto.                              | 30.      | 7 33                         | 33 5                       | 0 15                            | Ditto.               |
| 28.      | 19 20  | 20 45                      | 11 33                           | M. Azim.                            | 31.      | 9 17                         | 33 17                      | 1 0                             | Ditto.               |
|          | 19 20  | 20 45                      | 13 10                           | Ditto.                              | Nov. 1.  | 9 17                         | 33 17                      | 0 56                            | Ditto.               |
|          | 19 20  | 20 45                      | 13 27                           | Ditto.                              |          | 10 23                        | 33 25                      | 0 16                            | M. Azim.             |
|          | 18 40  | 21 0                       | 12 33                           | E. Azim.                            |          | 10 23                        | 33 25                      | 0 20                            | Ditto.               |
| 30.      | 15 39  | 22 42                      | 10 37                           | Ditto.                              |          | 10 58                        | 33 27                      | 0 34                            | E. Azim.             |
| Octo. 1. | 14 30  | 22 51                      | 10 0                            | M. Azim.                            | 2.       | 12 23                        | 33 32                      | 0 47                            | Ditto.               |
|          | 14 30  | 22 51                      | 11 40                           | Ditto.                              | 3.       | 14 26                        | 34 5                       | 2 40                            | M. Azim.             |
|          | 13 46  | 22 55                      | 11 0                            | E. Azim.                            |          | 15 14                        | 34 36                      | 4 29                            | E. Azim.             |
| 2.       | 12 24  | 23 0                       | 8 49                            | E. Amp.                             |          | 15 15                        | 34 36                      | 1 28                            | Ditto.               |
| 4.       | 11 48  | 23 25                      | 5 59                            | E. Azim.                            |          | 15 18                        | 34 38                      | 1 12                            | E. Amp.              |
|          | 11 48  | 23 25                      | 6 21                            | E. Amp.                             | 5.       | 18 8                         | 36 0                       | 3 27                            | M. Azim.             |
| 6.       | 9 46   | 23 22                      | 8 52                            | M. Azim.                            |          | 18 8                         | 36 0                       | 3 15                            | Ditto.               |
| 7.       | 9 38   | 23 14                      | 9 0                             | E. Azim.                            | 6.       | 19 15                        | 37 55                      | 4 49                            | E. Azim.             |
|          |  |                            |                                 |                                     | 7.       | 20 0                         | 39 0                       | 5 26                            | Ditto.               |
|          |  |                            |                                 |                                     | 8.       | 21 12                        | 39 20                      | 7 52                            | M. Amp.              |





# VARIATIONS OF THE COMPASS.

91

| 1769.      | Latitude of the Ship. South. | Longit. of the Ship. West. | Variation of the Compass. East. | Time when and Means. | 1770.      | Latitude of the Ship. South. | Longit. of the Ship. West. | Variation of the Compass. East. | Time when and Means. |
|------------|------------------------------|----------------------------|---------------------------------|----------------------|------------|------------------------------|----------------------------|---------------------------------|----------------------|
| ♀ Aug. 18. | 26 33                        | 149 42                     | 7 56                            | M. Amp.              | ♂ Mar. 7.  | 47 3                         | 191 25                     | 15 56                           | M. Azim.             |
| ♂ — 22.    | 31 22                        | 147 53                     | 7 30                            | E. Azim.             | ♀ — 8.     | 47 16                        | 192 10                     | 16 29                           | E. Amp.              |
| ♀ — 24.    | 32 40                        | 147 10                     | 7 18                            | M. Azim.             | ♂ — 14.    | 45 1                         | 193 14                     | 15 2                            | Ditto.               |
| ⊙ — 27.    | 33 14                        | 147 25                     | 6 40                            | Ditto.               | ♀ — 15.    | 44 34                        | 192 38                     | 13 48                           | E. Azim.             |
| ♂ — 30.    | 38 9                         | 147 25                     | 7 9                             | Ditto.               | ⊙ — 25.    | 40 22                        | 186 24                     | 12 20                           | M. Amp.              |
| ♀ Sept. 4. | 38 22                        | 146 18                     | 7 0                             | E. Azim.             | ♀ April 6. | 37 22                        | 197 10                     | 13 50                           | E. Azim.             |
| ♂ — 12.    | 33 0                         | 154 0                      | 8 8                             | Ditto.               | ♂ — 7.     | 37 42                        | 198 18                     | 13 56                           | Ditto.               |
| ♀ — 18.    | 29 0                         | 160 47                     | 8 36                            | E. Amp.              | ♀ — 9.     | 38 34                        | 201 30                     | 14 0                            | E. Amp.              |
| ♂ — 19.    | 29 0                         | 160 43                     | 8 29                            | M. Azim.             | ♂ — 10.    | 38 48                        | 201 40                     | 11 25                           | M. Amp.              |
| ⊙ — 24.    | 33 0                         | 164 30                     | 11 37                           | Ditto.               | ♀ — 12.    | 38 48                        | 202 45                     | 11 20                           | M. Azim.             |
| ♀ Octo. 2. | 33 30                        | 165 0                      | 10 48                           | E. Azim.             | ♂ — 13.    | 39 15                        | 204 5                      | 12 25                           | E. Azim.             |
| ♂ — 3.     | 37 15                        | 170 23                     | 10 50                           | M. Azim.             | ♀ — 14.    | 39 23                        | 204 21                     | 12 29                           | M. Azim.             |
| ♀ — 4.     | 36 50                        | 177 15                     | 13 22                           | Ditto.               | ♂ — 14.    | 39 24                        | 204 30                     | 11 28                           | E. Amp.              |
| ♀ — 5.     | 37 4                         | 177 40                     | 12 48                           | E. Azim.             | ♀ — 20.    | 39 25                        | 104 37                     | 11 30                           | M. Azim.             |
| ♂ — 6.     | 38 32                        | 180 34                     | 12 50                           | Ditto.               | ⊙ — 22.    | 37 10                        | 210 0                      | 10 30                           | Ditto.               |
| ♀ — 14.    | 38 33                        | 180 36                     | 12 44                           | E. Amp.              | ♂ — 24.    | 36 34                        | 210 0                      | 10 42                           | E. Azim.             |
| ♂ — 14.    | 39 6                         | 180 45                     | 14 2                            | M. Azim.             | ♀ — 25.    | 35 33                        | 209 46                     | 9 50                            | M. Azim.             |
| ♀ — 14.    | 39 11                        | 181 0                      | 15 4                            | E. Azim.             | ♂ — 25.    | 35 25                        | 209 22                     | 7 41                            | M. Amp.              |
| ♂ — 14.    | 39 11                        | 181 3                      | 15 5                            | E. Amp.              | ♀ — 25.    | 35 23                        | 209 20                     | 7 54                            | M. Azim.             |
| ♀ Nov. 9.  | 39 40                        | 182 52                     | 14 10                           | E. Azim.             | ♂ — 25.    | 35 10                        | 209 15                     | 9 15                            | E. Azim.             |
| ♂ — 25.    | 39 58                        | 182 35                     | 10 22                           | M. Azim.             | ♀ — 25.    | 35 10                        | 209 15                     | 9 36                            | E. Amp.              |
| ⊙ — 26.    | 36 48                        | 183 56                     | 11 9                            | Mercury Bay.         | ♂ — 25.    | 34 40                        | 209 0                      | 9 21                            | M. Amp.              |
| ♂ — 28.    | 35 46                        | 185 15                     | 12 37                           | M. Azim.             | ♀ — 25.    | 34 36                        | 209 0                      | 9 7                             | M. Azim.             |
| ♀ Dec 8.   | 35 15                        | 185 15                     | 13 10                           | M. Amp.              | ♂ — 25.    | 34 18                        | 208 52                     | 8 48                            | E. Azim.             |
| ♂ — 9.     | 35 0                         | 185 12                     | 11 45                           | M. Azim.             | ♀ May 4.   | 34 6                         | 208 50                     | 6 42                            | M. Azim.             |
| ⊙ — 10.    | 34 41                        | 185 30                     | 12 51                           | Ditto.               | ♂ — 6.     | 33 44                        | 208 30                     | 8 0                             | E. Azim.             |
| ♀ — 25.    | 34 38                        | 186 3                      | 12 41                           | E. Azim.             | ♀ — 7.     | 33 22                        | 208 21                     | 7 56                            | M. Azim.             |
| ♂ — 25.    | 34 36                        | 186 6                      | 12 40                           | E. Amp.              | ♀ — 10.    | 33 23                        | 208 18                     | 8 25                            | E. Azim.             |
| ♀ — 25.    | 34 39                        | 186 30                     | 12 20                           | Ditto.               | ♂ — 11.    | 33 4                         | 208 6                      | 8 0                             | M. Amp.              |
| ♂ — 25.    | 33 58                        | 188 0                      | 11 25                           | M. Azim.             | ♀ — 11.    | 32 36                        | 207 39                     | 8 0                             | E. Amp.              |
| ♀ Jan. 6.  | 35 7                         | 187 38                     | 12 26                           | M. Azim.             | ♂ — 13.    | 32 25                        | 207 25                     | 9 10                            | M. { Am. Azim.       |
| ♂ — 11.    | 38 13                        | 185 20                     | 15 0                            | E. Azim.             | ♀ — 17.    | 30 55                        | 206 36                     | 9 26                            | M. Azim.             |
| ♀ — 12.    | 39 0                         | 185 15                     | 14 15                           | M. Azim.             | ♂ — 17.    | 30 36                        | 206 45                     | 8 13                            | E. Azim.             |
| ♂ — 13.    | 39 44                        | 185 45                     | 12 55                           | E. Amp.              | ♀ — 18.    | 26 20                        | 206 43                     | 8 40                            | Ditto.               |
| ♀ — 15.    | 40 30                        | 186 0                      | 13 5                            | M. Azim.             | ♂ — 19.    | 25 30                        | 206 41                     | 8 36                            | Ditto.               |
| ⊙ Feb. 11. | 40 54                        | 183 2                      | 14 0                            | M. Amp.              | ♀ — 19.    | 25 22                        | 206 35                     | 8 23                            | M. Amp.              |
| ♂ — 13.    | 41 18                        | 183 10                     | 14 15                           | E. Amp.              | ♂ — 21.    | 25 20                        | 206 35                     | 8 20                            | M. Azim.             |
| ♀ — 13.    | 42 8                         | 184 45                     | 15 8                            | E. Azim.             | ♀ — 21.    | 24 54                        | 206 33                     | 8 45                            | E. Azim.             |
| ♂ — 17.    | 42 10                        | 184 46                     | 15 0                            | E. Amp.              | ♂ — 22.    | 24 30                        | 207 36                     | 8 3                             | E. Amp.              |
| ♀ — 17.    | 44 2                         | 186 42                     | 14 32                           | M. Amp.              | ♀ — 25.    | 24 24                        | 208 2                      | 7 50                            | M. Azim.             |
| ♂ — 18.    | 44 3                         | 186 45                     | 14 16                           | M. Azim.             | ♂ — 25.    | 24 10                        | 208 11                     | 8 30                            | E. Amp.              |
| ⊙ — 18.    | 44 55                        | 186 48                     | 15 36                           | M. Amp.              | ♀ — 25.    | 23 18                        | 209 10                     | 7 28                            | E. Azim.             |
| ♂ — 28.    | 47 32                        | 187 24                     | 16 34                           | E. Azim.             | ♂ June 2.  | 21 7                         | 210 56                     | 6 45                            | M. Amp.              |
| ♀ Mar. 4.  | 46 26                        | 189 24                     | 16 16                           | M. Azim.             | ⊙ — 3.     | 20 38                        | 211 25                     | 6 57                            | M. Azim.             |
| ♂ — 6.     | 46 55                        | 191 32                     | 15 10                           | E. Amp.              | ♂ — 5.     | 19 20                        | 212 42                     | 5 35                            | M. Amp.              |

## VARIATIONS OF THE COMPASS.

| 1770.                                  | Latitude of the Ship. South. | Longit. of the Ship. West. | Variation of the Compass. East. | Time when and Means.  | 1771.     | Latitude of the Ship. South. | Longit. of the Ship. East. | Variation of the Compass. West. | Time when and Means. |
|--|------------------------------|----------------------------|---------------------------------|-----------------------|-----------|------------------------------|----------------------------|---------------------------------|----------------------|
| June 6.                                | 19 3                         | 213 8                      | 5 31                            | M. Amp.               | April 24. | 25 22                        | 8 42                       | 17 30                           | M. Az. & Am.         |
| — 7.                                   | 18 55                        | 213 20                     | 5 26                            | E. Amp.               | — 27.     | 19 48                        | 2 43                       | 14 0                            | E. Azim.             |
| — 9.                                   | 18 57                        | 213 27                     | 5 0                             | M. Amp.               | — 28.     | 18 26                        | 1 30                       | 13 53                           | Ditto.               |
| — 17.                                  | 17 5                         | 214 0                      | 4 53                            | Ditto.                | May 5.    | 15 20                        | 6 28                       | 13 10                           | M. Azim.             |
| — 21.                                  | 12 38                        | 216 17                     | 4 9                             | M. Azim.              | — 7.      | 12 25                        | 9 55                       | 12 50                           | Ditto.               |
| — 22.                                  | 10 45                        | 217 36                     | 3 5                             | M. Amp.               | — 8.      | 10 20                        | 12 12                      | 11 42                           | E. Az. & Am.         |
| — 27.                                  | 10 45                        | 217 40                     | 3 8                             | M. Azim.              | — 13.     | 3 15                         | 18 36                      | 10 0                            | M. Azim.             |
| — 27.                                  | 10 46                        | 218 15                     | 2 54                            | E. Amp.               | — 16.     | North.                       |                            |                                 | Ditto.               |
| — 27.                                  | 10 8                         | 220 13                     | 2 30                            | M. Amp.               | — 19.     | 0 38                         | 21 45                      | 9 30                            | M. Azim.             |
| — 27.                                  | 9 45                         | 220 55                     | 2 51                            | E. Amp.               | — 23.     | 4 15                         | 24 5                       | 7 40                            | M. Az. & Am.         |
| Sept. 1.                               | 7 38                         | 222 15                     | 2 34                            | Ditto.                | — 26.     | 7 42                         | 26 8                       | 9 40                            | M. Azim.             |
| — 2.                                   | 7 0                          | 222 8                      | 2 4                             | Ditto.                | — 31.     | 10 33                        | 30 0                       | 6 30                            | Ditto.               |
| — 3.                                   | 7 18                         | 221 45                     | 2 30                            | Ditto.                | — 1.      | 18 32                        | 36 40                      | 5 9                             | Ditto.               |
| — 8.                                   |                              |                            | West.                           |                       | June 1.   | 20 2                         | 37 48                      | 6 40                            | Ditto.               |
| — 8.                                   | 9 43                         | 232 12                     | 0 12                            | E. Azim.              | — 2.      | 21 8                         | 39 20                      | 5 4                             | Ditto.               |
| — 10.                                  | 9 43                         | 232 12                     | 0 5                             | E. Amp.               | — 4.      | 23 27                        | 41 32                      | 4 30                            | Ditto.               |
| — 13.                                  | 10 0                         | 233 5                      | 0 2                             | M. Amp.               | — 6.      | 25 40                        | 43 15                      | 5 5                             | M. Amp.              |
| — 13.                                  | 9 38                         | 234 0                      | 1 10                            | Ditto.                | — 7.      | 25 44                        | 43 15                      | 6 4                             | M. Azim.             |
| — 14.                                  | 9 40                         | 234 2                      | 1 27                            | M. Azim.              | — 8.      | 27 8                         | 43 40                      | 5 20                            | Ditto.               |
| — 14.                                  | 9 54                         | 234 22                     | 2 4                             | Ditto.                | — 9.      | 28 38                        | 43 40                      | 5 24                            | Ditto.               |
| — 16.                                  | 10 15                        | 236 12                     | 1 49                            | E. Amp.               | — 9.      | 29 51                        | 44 12                      | 7 36                            | M. Amp.              |
| — 23.                                  | 11 10                        | 240 48                     | 2 44                            | E. Azim.              | — 11.     | 29 55                        | 44 14                      | 7 30                            | M. Azim.             |
| — 26.                                  | 11 10                        | 246 49                     | 3 10                            | Ditto.                | — 12.     | 30 23                        | 44 20                      | 9 0                             | E. Azim.             |
| 1771.                                  |                              | East.                      |                                 |                       | — 13.     | 30 25                        | 44 22                      | 9 18                            | E. Amp.              |
| Jan. 26.                               | 10 0                         | 102 55                     | 2 51                            | E. Azim.              | — 14.     | 32 20                        | 45 36                      | 7 0                             | Ditto.               |
| Feb. 2.                                | 15 50                        | 94 14                      | 2 56                            | Ditto.                | — 15.     | 32 57                        | 45 30                      | 6 55                            | M. Azim.             |
| — 6.                                   | 18 35                        | 85 18                      | 3 24                            | Ditto.                | — 16.     | 33 18                        | 45 18                      | 8 23                            | E. Az. & Am.         |
| — 13.                                  | 21 55                        | 71 6                       | 4 10                            | Ditto.                | — 17.     | 34 0                         | 45 10                      | 8 15                            | M. Amp.              |
| — 16.                                  | 23 2                         | 64 50                      | 10 20                           | Ditto.                | — 18.     | 34 2                         | 45 8                       | 8 14                            | M. Azim.             |
| — 19.                                  | 24 32                        | 57 3                       | 12 15                           | Ditto.                | — 19.     | 34 30                        | 44 56                      | 8 14                            | E. Amp.              |
| — 22.                                  | 26 15                        | 50 3                       | 17 30                           | E. Amp.               | — 20.     | 38 32                        | 41 40                      | 9 0                             | E. Azim.             |
| — 24.                                  | 27 53                        | 45 50                      | 24 20                           | E. Azim.              | — 21.     | 39 0                         | 39 26                      | 14 13                           | Ditto.               |
| — 25.                                  | 28 37                        | 44 39                      | 24 0                            | M. Amp.               | — 22.     | 39 1                         | 39 24                      | 14 18                           | E. Amp.              |
| — 25.                                  | 29 4                         | 43 52                      | 26 10                           | E. Azim.              | — 23.     | 39 48                        | 38 40                      | 14 24                           | M. Amp.              |
| Mar. 3.                                | 31 14                        | 33 0                       | 25 35                           | Ditto.                | — 24.     | 43 45                        | 17 12                      | 18 30                           | E. Azim.             |
| — 8.                                   | 33 55                        | 28 2                       | 28 30                           | M. Amp.               | — 30.     | 44 26                        | 16 25                      | 19 30                           | M. Azim.             |
| — 8.                                   | 34 0                         | 27 58                      | 28 8                            | M. Azim.              | — 30.     | 44 40                        | 15 38                      | 23 0                            | E. Azim.             |
| — 9.                                   | 35 35                        | 23 50                      | 24 0                            | E. Amp.               | July 1.   | 44 52                        | 14 18                      | 22 50                           | M. Azim.             |
| — 11.                                  | 34 54                        | 20 42                      | 22 30                           | Ditto.                | — 2.      | 45 57                        | 12 47                      | 20 36                           | E. Azim.             |
| Cape la Aguilhas W. distant 3 leagues. |                              |                            |                                 | Several Observations. | — 3.      | 45 28                        | 11 52                      | 21 24                           | Ditto.               |
| Table Bay, Cape of Good Hope.          |                              |                            |                                 |                       | — 4.      | 45 29                        | 11 50                      | 21 27                           | E. Amp.              |
|  |                              |                            |                                 |                       | — 4.      | 45 25                        | 10 57                      | 20 0                            | M. Amp.              |
| April 22.                              | 27 12                        | 10 16                      | 17 40                           | E. Az. & Am.          | — 6.      | 45 25                        | 10 53                      | 20 20                           | M. Azim.             |
| — 23.                                  | 26 30                        | 9 28                       | 18 37                           | M. Azim.              | — 6.      | 45 50                        | 9 25                       | 22 30                           | E. Amp.              |
| — 23.                                  | 26 11                        | 9 10                       | 17 0                            | E. Amp.               |           |                              |                            |                                 |                      |

DEDUCTIONS *from the preceding* OBSERVATIONS.

1. According to Captain Cook's log, the ship ran 16 miles west  $\frac{1}{4}$  north after the observations were made on the 12th of November, 1768, to 8 o'clock in the evening, when the Sugar-loaf Isle, which lies in the entrance of the harbour of Rio Janiero, bore W. N. W. distant 5 leagues: and he adds, that the Sugar-loaf bears S. W.  $4\frac{1}{2}$  miles from the city of St. Sebastian. From these data, I conclude the ship was  $29'$  in longitude east of that city when these observations were made: and, as the mean result of the observations is  $42^{\circ} 58' W.$  the longitude of the city will be  $43^{\circ} 27' W.$  Again, the ship had made  $46'$  of east longitude from the city of St. Sebastian, by Captain Cook's reckoning, when the observations were made on the 12th of December,  $32'$  east when the observations were made on the 15th,  $40'$  west when the observations were made on the 17th, and  $1^{\circ} 19'$  west when the observations were made on the 18th of the same month: the mean results of the observations on these days are  $42^{\circ} 38'\frac{1}{4} W.$   $42^{\circ} 33'\frac{1}{4} W.$   $44^{\circ} 01'\frac{1}{8} W.$  and  $44^{\circ} 32'\frac{1}{4} W.$ : consequently, the longitudes of the city of St. Sebastian will be  $43^{\circ} 24'\frac{1}{4} W.$   $43^{\circ} 5'\frac{1}{4} W.$   $43^{\circ} 21'\frac{1}{8} W.$  and  $43^{\circ} 13'\frac{1}{2} W.$  by these observations, respectively. The mean of the five results is  $43^{\circ} 18' 26''\frac{1}{2} W.$  I am persuaded this determination is too great, though perhaps not much; for I have seen a great number of observations of the eclipses of Jupiter's satellites which were made here; and which, as they are calculated (and for any thing I know to the contrary they are calculated right) make the longitude of this place exactly the same. But let this be as it may, it is certain that Mr. Green's observations of the 1st, 2d, 3d, and 4th of November, when carried on to Rio Janiero by Captain Cook's reckoning, give the longitude of that place no more than  $39^{\circ} 28'\frac{1}{4} W.$   $39^{\circ} 20'\frac{1}{4} W.$   $40^{\circ} 24'\frac{1}{4} W.$  and  $39^{\circ} 13'\frac{1}{4} W.$  respectively. I have no doubt but that all these observations, except the second, give

too small a longitude; for Captain Cook remarks, that the mean result of those which were taken on the first was less by a whole degree than the longitude by account, carried on from the observations which were made on the 27th of October. But supposing the whole of this error to lie in the latter observations, there will still remain an error in the reckoning of about two degrees and an half, which the ship must have been set to the westward in running along the coast of Brazil, from the latitude of 13 degrees south to that of 23 degrees south, which is a very great quantity, the direction of the coast being considered. Captain Cook takes no notice of feeling the effect of any current in latitude before the 8th at noon, when he observes that the ship was found 10 miles to the southward of the account; and the following days he observes that the ship was found 10 and 12 miles to the southward of the account; so that it is evident a pretty strong current sets south-westerly along this part of the coast of South America.

2. After leaving Rio Janiero the dead reckoning appears to have corresponded very exactly with the lunar observations all the way until they arrived on the coast of Terra del Fuego; but in this run the ship was frequently found several miles to the southward of the account, and once, soon after leaving the Rio Janiero, to the northward of it. The instances, as I find them in Captain Cook's journal are these: December the 12th, at noon, the ship was 10 miles north of the account; on the 19th it was 7 miles south of the account; on the 20th it was 11 miles; on the 21st it was 16 miles; and on the 26th it was 26 miles the same way; but Captain Cook remarks, that he had great reason to suspect much of this last difference had arisen from bad steerage.

3. The result of the observations which were made off Cape St. Diego, on the 13th of January, 1769, is nearly a whole degree to the westward of the reckoning by the log: and this difference is attributed, by Captain Cook, to an indraught which may be caused by the Straits of Magelhaens, and to the current, which, coming round Cape Horn, sets through Straits le Maire, and, as he thinks, eastward, along the northern

thern coast of Terra del Fuego. But if any confidence can be put in Mr. Green's subsequent observations, or in those which I made on this coast in Captain Cook's second voyage, the longitude resulting from the observations which were made on the 13th of January, is near a degree too great; which is not at all surprising, if we consider, that although the air was extremely clear when these observations were made, yet the sea ran so high that it filled the quarter deck three times while they were observing; and the motion of the ship was so great that Captain Cook did not attempt to observe. The longitude of Cape St. Diego, from these observations, is,  $66^{\circ} 4' \frac{1}{2}$  W. My observations place it  $65^{\circ} 14'$  W. of Greenwich.

4. The mean result of the observations which were made on the 26th of January, is  $66^{\circ} 47' 22'' \frac{1}{2}$  W. to which if there be added  $27' 54''$ , the distance which the ship was east of Cape Horn in longitude when the observations were made, (see page 23) the sum will be  $67^{\circ} 15' 16''$  W. which is the longitude of Cape Horn by these observations. In like manner, the medium results of the observations which were made on the 27th, 28th, and 29th are  $68^{\circ} 54' 15''$  W.  $71^{\circ} 43' 25''$  W. and  $73^{\circ} 20' 35''$  W. from which if there be subtracted  $1^{\circ} 31' 15''$ ,  $4^{\circ} 27' 0''$ , and  $5^{\circ} 51' 0''$  the quantities which the ship was west of Cape Horn in longitude, when the respective observations were made, (see page 23) the results will be  $67^{\circ} 23' 00''$  W.  $67^{\circ} 16' 25''$  W. and  $67^{\circ} 29' 35''$  W. the longitudes of Cape Horn resulting from the several observations. I have shewn above, that it is highly probable the observations which were taken off Cape St. Diego are near a degree too great: but as they were taken when the moon was on the east side of the sun, and those of the 26th, 27th, 28th, and 29th, when it was on the west side, it may not be improper to take them into the account also, and when reduced to Cape Horn by Captain Cook's map, annexed to Hawkesworth's account of this voyage, give  $68^{\circ} 17' \frac{1}{2}$  W. The mean of these five results is  $67^{\circ} 32' 21''$  W.

Perhaps

Perhaps I ought to take notice here, that in Captain Cook's map of the eastern coast of Terra del Fuego, referred to above, as well as in Dr. Hawkesworth's narrative, the longitude assigned to Cape Horn is greater than I make it by more than two-thirds of a degree, and to assign the cause of so great a difference. It appears clearly, from Captain Cook's journal, that he deduced the longitude of Cape Horn entirely from the observations which were made on the 13th, 26th, and 27th of January. I have already assigned my reasons for thinking the first of these gives a result which is too great by almost a whole degree. Captain Cook rejects the observation of Regulus, and the first of the three observations of the sun which were made on the 26th, and retains only the two last; and, in computing them, has unfortunately made a mistake of more than a whole degree; for he says "the mean result is  $68^{\circ} 12' W.$ :" but those who will take the trouble of computing them, will find it no more than  $67^{\circ} 2' W.$  He says also, "that the mean result of the observations which were made on the 27th is  $69^{\circ} 7' W.$ ;" whereas, I can make no more of it than  $68^{\circ} 54' \frac{1}{4} W.$  The truth is, they have made an error of half a degree in computing the middle observation; and these two errors cause the principal part of the difference between us, which is still farther increased by my combining the observation of the 13th with four others, where the resulting longitudes are less, instead of two only, as Captain Cook has done. It is remarkable, that Captain Cook takes particular notice of the great difference which there is between the results of the observations of the 26th and 27th; but thinks it may have arisen partly from the ship's run, and partly from the observations themselves; he has, notwithstanding, written with a black lead pencil in the margin of his journal, "This to be reconsidered;" which if he had done, he must have discovered the mistake.

From the note at the bottom of the 23d page it follows, that the longitude of Diego Ramiriz is  $68^{\circ} 1' \frac{1}{4} W.$



5. In order to determine the situation of the ship every day at noon, and from thence the situations of the islands which were seen in the Pacific Ocean this voyage, it will be necessary to remark, that I suppose, for the reasons which are given above, Captain Cook set out from Cape Horn with an error on his reckoning of 41 minutes of longitude in excess. That reckoning gave  $67^{\circ} 49' 45''$  W. when the observations were made on the 26th of January,  $69^{\circ} 49' 30''$  W. when those of the 27th were made,  $72^{\circ} 40' 00''$  W. when those of the 28th were made, and  $73^{\circ} 59' 40''$  W. when those of the 29th were made; and, as I have already observed, the mean results of these observations were  $66^{\circ} 47' 22''$  west,  $68^{\circ} 54' 15''$  west,  $71^{\circ} 43' 25''$  west, and  $73^{\circ} 20' 35''$  west, respectively: the several errors of the reckoning will therefore be  $62' 22''$ ,  $55' 15''$ ,  $56' 35''$ , and  $39' 5''$ , all in excess; and the mean error,  $53' 19''$  in excess. In all these the sun was east of the moon. On the 11th, 12th, and 14th of February, the sun being then west of the moon, the mean results of observations, taken these days, were  $89^{\circ} 9' 9''$  west,  $89^{\circ} 57' 42''$  west, and  $91^{\circ} 2' 48''$  west, Captain Cook's reckoning gave  $87^{\circ} 51' 30''$  west,  $89^{\circ} 29' 40''$  west, and  $91^{\circ} 24' 24''$  west, at these times; consequently, the errors of the reckoning are  $77' 39''$ , and  $28' 2''$  in defect, and  $21' 36''$  in excess, and the mean of them is  $28' 2''$  in defect: the mean of these two means, or  $12' 39''$  too much, I shall conclude was the real error of Captain Cook's account in longitude on the 6th of February at noon; which was the day of the full-moon.

The medium of the observations which were made on the 26th of February is  $109^{\circ} 3' 00''$  west, and of those which were taken on the 27th  $109^{\circ} 55' 20''$  W.; Captain Cook's reckoning gave  $110^{\circ} 20' 00''$  west, and  $110^{\circ} 32' 17''$  W. at these two times; consequently, the two errors are  $76' 00''$ , and  $36' 57''$  in excess, and the mean of them  $56' 58''$  in excess. The mean of this mean and the error when the sun was west of the moon, is  $14' 28''$  in excess. And by this quantity I suppose Captain Cook's reckoning exceeded the truth on the 20th of February, which was the day of the new-moon.



The result of the observations which were made on the 12th of March is  $125^{\circ} 6' 30''$  W. The mean result of those which were made on the 13th of March is  $126^{\circ} 4' 5''$  west, on the 15th  $126^{\circ} 33' 30''$  west, on the 16th,  $127^{\circ} 0' 56''$  west, and on the 18th,  $127^{\circ} 9' 56''$  W.: Captain Cook's reckoning at these five times, was  $124^{\circ} 40' 26''$  west,  $125^{\circ} 33' 8''$  west,  $126^{\circ} 55' 0''$  west,  $127^{\circ} 13' 40''$  W. and  $129^{\circ} 9' 0''$  W. The five errors are, therefore,  $26' 4''$  and  $30' 57''$  in defect, and  $21' 30''$ ,  $12' 44''$ , and  $119' 4''$  in excess; and the mean of the whole  $19' 15''$  in excess. The mean of this, and the mean error when the sun was east of the moon, ( $56' 43''$  in excess) is  $38' 7''$  in excess; which I shall take for the real error of the reckoning at noon on the day of new-moon, which was March the 7th.

The mean results of the observations which were made on the 29th and 30th of March, are  $127^{\circ} 3' 7''$  W. and  $129^{\circ} 22' 18''$  W.; and the reckoning, at these two times, was  $129^{\circ} 21' \frac{1}{8}$  W. and  $131^{\circ} 11'$  W. On the 1st of April, the mean result of the three first observations is  $133^{\circ} 36' 15''$  W. and of the two last  $133^{\circ} 53' 32''$  W.; and Captain Cook's reckoning at these two times gave  $135^{\circ} 7' 30''$  W. and  $135^{\circ} 19' 00''$  W. Hence, the four errors are  $2^{\circ} 18' 00''$ ,  $1^{\circ} 48' 42''$ ,  $1^{\circ} 31' 15''$ , and  $1^{\circ} 25' 28''$ , all in excess. The mean of these is  $1^{\circ} 45' 51''$ ; and the mean of this and the mean error, ( $19' 15''$ ) when the sun was west of the moon, is  $1^{\circ} 2' 33''$  in excess. And this may be taken as the real error of the account in longitude at noon on the 22d of March, which was the day of the full-moon.

April the 10th, the sun being again on the west side of the moon, the mean result of the observations is  $148^{\circ} 29'$  W.; and the reckoning, at the same time,  $148^{\circ} 22' \frac{1}{8}$  W.; so that the error appears again to be in defect  $6' 8''$ : the mean of which, and the last result ( $105' 51''$  in excess,) gives  $49' 51''$  in excess for the real error of the reckoning on the 6th of April, which was new-moon.

By working the log quite home to point Venus, it appears, that the real error of Captain Cook's reckoning was, at that time,  $16' 00''$  in excess; as it makes the longitude of Point Venus  $149^{\circ} 42' \frac{1}{2}$  W. of Greenwich.

From these data, and allowing a proportional part of the variation in the error to have happened every day between one semi-lunation and another, I have formed the following table; which exhibits the latitude of the ship at the noon of every day during their passage from Cape Horn to Otaheite, and its longitude, both according to Captain Cook's reckoning, and after it has been corrected by the error, derived in the manner which has been explained above. But it must be observed, that I have increased Captain Cook's difference of longitude on the 7th of April, by 20 minutes; and, consequently, his reckoning every day afterwards until he arrived at Otaheite. For it is very evident, both from the courses and distances given by the log that day, and his own bearings and distances between the islands which they saw that day, the day before, and the day following it, that he must have made a mistake of 20 miles in his distance, which, from the course they ran, and the latitude they were in, made about the same number of minutes in longitude.

| 1769.       | Latitude of<br>the Ship S. | Long. by the<br>Reckon. W. | Error of<br>Reckoning. | True Long. of<br>the Ship W. |                         |
|-------------|----------------------------|----------------------------|------------------------|------------------------------|-------------------------|
|             | ° /                        | ° /                        | ° /                    | ° /                          |                         |
| 24 Jan. 26. | 56. 57                     | 68. 13                     | — 40 $\frac{2}{3}$     | 67. 32 $\frac{1}{3}$         | Cape Horn, N. 58 Miles. |
| 27.         | 57. 3 $\frac{1}{2}$        | 68. 27                     | — 38                   | 67. 49                       |                         |
| 28.         | 58. 4                      | 70. 1                      | — 35 $\frac{1}{2}$     | 69. 25 $\frac{1}{2}$         |                         |
| 29.         | 58. 59 $\frac{2}{3}$       | 72. 48                     | — 33                   | 72. 15                       |                         |
| 30.         | 60. 4 $\frac{1}{2}$        | 74. 10                     | — 30 $\frac{1}{2}$     | 73. 39 $\frac{1}{2}$         |                         |
| 31.         | 59. 48 $\frac{1}{2}$       | 75. 54                     | — 28                   | 75. 26                       |                         |
| 1 Feb. 1.   | 58. 44                     | 78. 42                     | — 25 $\frac{1}{2}$     | 78. 16 $\frac{3}{4}$         |                         |
| 2.          | 58. 30                     | 80. 58                     | — 22 $\frac{3}{4}$     | 80. 35 $\frac{1}{4}$         |                         |
| 3.          | 58. 30                     | 81. 55                     | — 20 $\frac{1}{4}$     | 81. 34 $\frac{3}{4}$         |                         |
| 4.          | 57. 46 $\frac{2}{3}$       | 82. 16                     | — 17 $\frac{2}{3}$     | 81. 58 $\frac{1}{3}$         |                         |
| 5.          | 56. 46                     | 82. 16                     | — 15 $\frac{1}{2}$     | 82. 0 $\frac{3}{4}$          | New Moon.               |
| 6.          | 55. 17 $\frac{2}{3}$       | 82. 23                     | — 12 $\frac{2}{3}$     | 82. 10 $\frac{1}{3}$         |                         |
| 7.          | 54. 40                     | 82. 54                     | — 12 $\frac{1}{4}$     | 82. 41 $\frac{1}{4}$         |                         |
| 8.          | 53. 41 $\frac{1}{2}$       | 83. 19                     | — 13                   | 83. 6                        |                         |

## DEDUCTIONS. FROM THE

| • 1769.    | Latitude of<br>the Ship S. | Long. by the<br>Reckon. W. | Error of<br>Reckoning. | True Long. of<br>the Ship W. |            |
|------------|----------------------------|----------------------------|------------------------|------------------------------|------------|
|            | o /                        | o /                        | /                      | o /                          |            |
| 24 Feb. 9. | 52. 22                     | 86. 17                     | — 13                   | 86. 4                        |            |
| 9 — 10.    | 51. 16                     | 86. 37                     | — $13\frac{1}{4}$      | 86. $23\frac{3}{4}$          |            |
| h — 11.    | 50. 55                     | 87. 24                     | — $13\frac{1}{4}$      | 87. $10\frac{1}{4}$          |            |
| ⊙ — 12.    | 49. $40\frac{1}{2}$        | 89. 36                     | — $13\frac{1}{2}$      | 89. $22\frac{1}{2}$          |            |
| ☾ — 13.    | 49. $31\frac{1}{2}$        | 90. 37                     | — $13\frac{1}{2}$      | 90. $23\frac{1}{2}$          |            |
| ♂ — 14.    | 49. 7                      | 91. 12                     | — $13\frac{2}{3}$      | 90. $58\frac{1}{3}$          |            |
| ♀ — 15.    | 48. 27                     | 92. 5                      | — $13\frac{3}{4}$      | 91. $51\frac{1}{4}$          |            |
| 24 — 16.   | 48. 1                      | 94. 25                     | — $13\frac{3}{8}$      | 94. $11\frac{1}{8}$          |            |
| ♀ — 17.    | 46. 48                     | 97. 17                     | — 14                   | 97. 3                        |            |
| h — 18.    | 44. 50                     | 99. 7                      | — 14                   | 98. 53                       |            |
| ⊙ — 19.    | 43. 21                     | 100. 21                    | — $14\frac{1}{4}$      | 100. $6\frac{1}{4}$          |            |
| ☾ — 20.    | 43. 46                     | 101. 34                    | — $14\frac{1}{2}$      | 101. $19\frac{1}{2}$         | Full Moon. |
| ♂ — 21.    | 44. 39                     | 103. 54                    | — 16                   | 103. 38                      |            |
| ♀ — 22.    | 44. 46                     | 106. 1                     | — $17\frac{1}{2}$      | 105. $43\frac{1}{2}$         |            |
| 24 — 23.   | 44. 35                     | 105. 52                    | — $19\frac{1}{4}$      | 105. $3\frac{3}{4}$          |            |
| ♀ — 24.    | 43. 37                     | 107. 6                     | — $20\frac{1}{2}$      | 106. $45\frac{1}{2}$         |            |
| h — 25.    | 42. 23                     | 109. 0                     | — $22\frac{1}{3}$      | 108. $57\frac{2}{3}$         |            |
| ⊙ — 26.    | 41. 4                      | 109. 52                    | — 24                   | 109. 28                      |            |
| ☾ — 27.    | 39. 43                     | 110. 26                    | — $25\frac{1}{2}$      | 110. $0\frac{1}{2}$          |            |
| ♂ — 28.    | 39. $32\frac{2}{3}$        | 110. 38                    | — 27                   | 110. 11                      |            |
| 8 Mar. 1.  | 38. 44                     | 111. 43                    | — $28\frac{2}{3}$      | 111. $14\frac{1}{3}$         |            |
| 24 — 2.    | 37. 18                     | 112. 5                     | — $30\frac{1}{2}$      | 111. $34\frac{1}{2}$         |            |
| ♀ — 3.     | 36. $49\frac{3}{4}$        | 111. 54                    | — $31\frac{1}{2}$      | 111. $22\frac{1}{2}$         |            |
| h — 4.     | 36. $12\frac{1}{2}$        | 112. 50                    | — $33\frac{1}{2}$      | 112. $16\frac{1}{2}$         |            |
| ⊙ — 5.     | 36. $20\frac{1}{2}$        | 114. 9                     | — 35                   | 113. 34                      |            |
| ☾ — 6.     | 36. 32                     | 114. 30                    | — $36\frac{1}{2}$      | 113. $53\frac{1}{2}$         |            |
| ♂ — 7.     | 37. $6\frac{1}{2}$         | 116. 8                     | — $38\frac{1}{2}$      | 115. $29\frac{1}{2}$         | New Moon.  |
| ♀ — 8.     | 37. 24                     | 117. 41                    | — $39\frac{1}{4}$      | 117. $1\frac{1}{4}$          |            |
| 24 — 9.    | 35. $47\frac{1}{2}$        | 119. 18                    | — $41\frac{1}{2}$      | 118. $36\frac{1}{2}$         |            |
| ♀ — 10.    | 34. 14                     | 120. 54                    | — 43                   | 120. 11                      |            |
| h — 11.    | 32. 54                     | 122. 35                    | — $44\frac{1}{2}$      | 121. $50\frac{1}{2}$         |            |
| ⊙ — 12.    | 31. $33\frac{1}{2}$        | 124. 25                    | — $46\frac{1}{4}$      | 123. $38\frac{3}{4}$         |            |
| ☾ — 13.    | 30. $46\frac{1}{4}$        | 125. 28                    | — $47\frac{7}{8}$      | 124. $40\frac{1}{8}$         |            |
| ♂ — 14.    | 30. 17                     | 126. 10                    | — $49\frac{1}{2}$      | 125. $20\frac{1}{2}$         |            |
| ♀ — 15.    | 29. $44\frac{1}{2}$        | 126. 53                    | — $51\frac{1}{2}$      | 126. $1\frac{1}{2}$          |            |
| 24 — 16.   | 29. $11\frac{2}{3}$        | 127. 8                     | — $52\frac{3}{4}$      | 126. $15\frac{1}{4}$         |            |
| ♀ — 17.    | 28. 31                     | 127. 29                    | — $54\frac{1}{3}$      | 126. $34\frac{2}{3}$         |            |
| h — 18.    | 27. 52                     | 128. 44                    | — 56                   | 127. 48                      |            |
| ⊙ — 19.    | 27. $39\frac{1}{4}$        | 129. 28                    | — $57\frac{5}{8}$      | 128. $30\frac{3}{8}$         |            |
| ☾ — 20.    | 25. $43\frac{3}{4}$        | 129. 28                    | — $59\frac{1}{4}$      | 128. $28\frac{3}{4}$         |            |
| ♂ — 21.    | 25. 22                     | 129. 28                    | — $60\frac{1}{27}$     | 128. 27                      | Full Moon. |
| ♀ — 22.    | 25. $22\frac{1}{3}$        | 129. 52                    | — $62\frac{1}{2}$      | 128. $49\frac{1}{2}$         |            |
| 24 — 23.   | 24. $44\frac{2}{3}$        | 130. 8                     | — $61\frac{2}{3}$      | 129. $6\frac{1}{3}$          |            |
| ♀ — 24.    | 23. 28                     | 129. 2                     | — $60\frac{2}{3}$      | 128. $1\frac{1}{3}$          |            |
| h — 25.    | 22. 11                     | 127. 55                    | — 60                   | 126. 55                      |            |
| ⊙ — 26.    | 21. $30\frac{1}{4}$        | 127. 43                    | — $59\frac{5}{8}$      | 126. $43\frac{3}{8}$         |            |
| ☾ — 27.    | 21. $2\frac{2}{3}$         | 127. 38                    | — $58\frac{1}{3}$      | 126. 39                      |            |
| ♂ — 28.    | 20. $29\frac{1}{3}$        | 127. 50                    | — $57\frac{1}{2}$      | 126. $52\frac{1}{2}$         |            |
| ♀ — 29.    | 20. 14                     | 128. 45                    | — $56\frac{2}{3}$      | 127. $48\frac{1}{3}$         |            |
| 24 — 30.   | 19. $34\frac{3}{4}$        | 129. 27                    | — $55\frac{1}{4}$      | 128. $31\frac{1}{4}$         |            |
| ♀ — 31.    | 19. $8\frac{1}{2}$         | 131. 21                    | — $54\frac{7}{8}$      | 130. $26\frac{1}{8}$         |            |

## DEDUCTIONS FROM THE

9. At noon, on the 6th, the land called TWO GROUPS, bore N. W. by W.  $\frac{1}{2}$  W. and was distant, as they found by their run, 15 miles. The latitude of the ship was then  $18^{\circ} 19' 40''$  S. and its longitude  $141^{\circ} 39' \frac{1}{2}''$  W. Hence the latitude of this island will be found  $18^{\circ} 12' 36''$  S. and its longitude  $141^{\circ} 54' 4''$  W.

10. At 8 o'clock in the morning of the 7th, BIRD ISLAND bore due east, and they were about two miles from the shore. From this situation the ship ran  $18\frac{1}{2}$  miles due west till noon, when they found the latitude to be  $17^{\circ} 49'$  S. and the longitude was (by the table)  $143^{\circ} 6'$  W. This island is, therefore, in latitude  $17^{\circ} 49'$  S. and longitude  $142^{\circ} 43' 24''$  W. of Greenwich.

11. On the 8th, at noon, the latitude was  $17^{\circ} 44'$  S. and the longitude  $144^{\circ} 54' 48''$  W. From this situation they ran 9 miles W.  $3\frac{1}{2}$  miles N. by W. and 12 miles N. by W.  $\frac{3}{4}$  W.; after which CHAIN ISLAND bore N.  $\frac{1}{4}$  W. and was distant about 2 leagues. Hence, I infer, that this island is in latitude  $17^{\circ} 26'$  south, and its longitude  $145^{\circ} 12' 21''$  west.

12. April the 10th, at noon, OSNABURG ISLAND bore N. by W.  $\frac{1}{2}$  W. and was distant about 4 leagues: the latitude of the ship was  $18^{\circ} 1'$  S. and its longitude  $147^{\circ} 38' 30''$  W. Hence we may infer, that the latitude of this island is  $17^{\circ} 49' \frac{1}{2}''$  S. and its longitude  $147^{\circ} 42' 10''$  W.

13. The methods by which I have deduced the latitude and longitude of Point Venus will be very fully and comprehensively expressed in the following tables.

| The Latitude of POINT VENUS, deduced from Meridional Altitudes of the Sun's L. L. Taken with Hadley's Quadrant. |          |                            |                          |                 |
|---|----------|----------------------------|--------------------------|-----------------|
|   | 1769.    | Merid. Alt. of Sun's L. L. | Sun's Declination North. | Latitude South. |
|   |          | ° ' "                      | ° ' "                    | ° ' "           |
| h   | May 6.   | 55 30 30                   | 16 48 20                 | 17 29 21        |
| h   | — 13.    | 53 42 00                   | 18 37 19                 | 17 28 56        |
| ☉   | — 28.    | 50 41 00                   | 21 37 18                 | 17 30 4         |
| ☽   | — 29.    | 50 33 00                   | 21 46 28                 | 17 28 54        |
| ♂   | — 30.    | 50 23 30                   | 21 55 14                 | 17 29 38        |
| h   | June 17. | 48 54 00                   | 23 25 49                 | 17 28 37        |
| ☽   | — 19.    | 48 50 30                   | 23 27 45                 | 17 30 11        |
| The mean of all is  |          |                            |                          | 17 29 23        |

| 1769.       | Latitude of the Ship S. | Long. by the Reckon. W. | Error of Reckoning. | True Long. of the Ship W. |                 |
|-------------|-------------------------|-------------------------|---------------------|---------------------------|-----------------|
| 1/2 Apr. 1. | 19. 4 $\frac{1}{2}$     | 133. 28                 | — 54                | 132. 34                   |                 |
| 2.          | 19. 1 $\frac{1}{2}$     | 135. 33                 | — 53 $\frac{1}{2}$  | 134. 39 $\frac{1}{2}$     |                 |
| 3.          | 18. 46                  | 137. 29                 | — 52 $\frac{1}{2}$  | 136. 36 $\frac{1}{2}$     |                 |
| 4.          | 18. 41 $\frac{1}{2}$    | 139. 29                 | — 51 $\frac{1}{2}$  | 138. 37 $\frac{1}{2}$     |                 |
| 5.          | 18. 23 $\frac{1}{2}$    | 140. 51                 | — 50 $\frac{1}{2}$  | 140. 0 $\frac{1}{2}$      |                 |
| 6.          | 18. 19 $\frac{1}{2}$    | 142. 29                 | — 49 $\frac{1}{2}$  | 141. 39 $\frac{1}{2}$     |                 |
| 7.          | 17. 49                  | 143. 51                 | — 45                | 143. 6                    | New Moon.       |
| 8.          | 17. 44                  | 145. 35                 | — 40 $\frac{1}{2}$  | 144. 54 $\frac{1}{2}$     |                 |
| 9.          | 17. 42 $\frac{1}{2}$    | 147. 0                  | — 35 $\frac{1}{2}$  | 146. 24 $\frac{1}{2}$     |                 |
| 10.         | 18. 1                   | 148. 9                  | — 30 $\frac{1}{2}$  | 147. 38 $\frac{1}{2}$     |                 |
| 11.         | 17. 38                  | 149. 0 $\frac{1}{2}$    | — 25 $\frac{1}{2}$  | 148. 35                   |                 |
| 12.         | 17. 38                  | 149. 19 $\frac{1}{2}$   | — 20 $\frac{1}{2}$  | 148. 58 $\frac{1}{2}$     |                 |
| 13.         | 17. 29 $\frac{1}{2}$    | 149. 42 $\frac{1}{2}$   | — 16                | 149. 26 $\frac{1}{2}$     | In Matavia Bay. |

6. Beside exhibiting the real situation of the ship every day at noon, the preceding table renders the business of determining the situations of the several islands which they saw, extremely easy. For, on the 4th of April, at noon, I find by the journals, that LAGOON ISLAND, the first which they saw in the Pacific Ocean, bore S. 14 E. and was distant about 5 miles: consequently, the Island was 4' 53" south of the ship in latitude, and 1' 3" east of it in longitude. And as I find, by the table, that the situation of the ship was 18° 41'  $\frac{2}{3}$  S. and 138° 37'  $\frac{1}{2}$  W. that of the Island must be 18° 46' 33" S. and 138° 36' 27" W. from Greenwich.

7. THRUMB-CAP, the second which they saw, is said, by the journals, to bear N. 62° W. from Lagoon Island, and that it is 21 miles distant from it. This course and distance, gives 9' 52" difference of latitude, and, in the latitude of 18°  $\frac{1}{2}$ , 19' 33", difference of longitude: consequently, the latitude of Thrumb-Cap is 18° 36' 41" S. and its longitude 138° 56" W.

8. The situation of the ship on the 5th, at noon, was 18 23' 20" S. and 140° 0' 20" W. After which they ran W.  $\frac{1}{2}$  N. 15 miles, W. 2 miles, W. S. W. 3 $\frac{1}{2}$  miles, and W. by N. 3 $\frac{1}{2}$  miles, and then had the middle of Bow ISLAND, due north of them; and they were about 4 miles from the reef which forms the south side of that group of Islets: consequently, the middle of it will be found to lie in 18° 17' S. and 140° 25' 20" W. longitude from Greenwich.

The Latitude of POINT VENUS deduced from Meridional Zenith Distances of the Sun and Stars which passed the Meridian to the northward of the Zenith. Observed with the Astronomical Quadrant.

| 1769.                        | Merid. Zen. Distance. |    |    | Declination North. |    |     | Latitude S. |    |     | Mean Results. |        |                          | Object and Observer. |
|------------------------------|-----------------------|----|----|--------------------|----|-----|-------------|----|-----|---------------|--------|--------------------------|----------------------|
|                              | °                     | '  | "  | °                  | '  | "   | °           | '  | "   | °             | '      | "                        |                      |
| h May 6                      | 34                    | 33 | 7  | 16                 | 48 | 20  | 17          | 29 | 28  | 17 28 22½     |        | ☉'s L. L. by Capt. Cook. |                      |
| 24 — 18.                     | 36                    | 58 | 12 | 19                 | 45 | 51  | 17          | 28 | 50  |               |        | ☉'s U. L. by Mr. Green.  |                      |
| h — 27.                      | 38                    | 39 | 10 | 21                 | 27 | 47  | 17          | 27 | 52  |               |        | ☉'s U. L. by Mr. Green.  |                      |
| ☉ — 28.                      | 38                    | 50 | 0  | 21                 | 37 | 18  | 17          | 29 | 11  |               |        | ☉'s U. L. by Mr. Green.  |                      |
| ☽ — 29.                      | 38                    | 59 | 0  | 21                 | 46 | 28  | 17          | 29 | 1   |               |        | ☉'s U. L. by Mr. Green.  |                      |
| ♂ — 30.                      | 39                    | 8  | 12 | 21                 | 55 | 14  | 17          | 29 | 27  |               |        | ☉'s U. L. by Capt. Cook. |                      |
| ♀ — 31.                      | 39                    | 16 | 21 | 22                 | 3  | 38  | 17          | 29 | 13  |               |        | ☉'s U. L. by Mr. Green.  |                      |
| h June 7.                    | 40                    | 3  | 32 | 22                 | 51 | 33  | 17          | 28 | 29  |               |        | ☉'s U. L. by Mr. Green.  |                      |
| 24 — 8.                      | 40                    | 9  | 0  | 22                 | 56 | 48  | 17          | 28 | 42  |               |        | ☉'s U. L. by Mr. Green.  |                      |
| ♀ — 9.                       | 40                    | 13 | 0  | 23                 | 1  | 39  | 17          | 27 | 51  |               |        | ☉'s U. L. by Mr. Green.  |                      |
| h — 10.                      | 40                    | 17 | 0  | 23                 | 6  | 6   | 17          | 27 | 24  |               |        | ☉'s U. L. by Mr. Green.  |                      |
| ☉ — 11.                      | 40                    | 21 | 00 | 23                 | 10 | 9   | 17          | 27 | 21  |               |        | ☉'s U. L. by Mr. Green.  |                      |
| ☽ — 12.                      | 40                    | 26 | 4  | 23                 | 13 | 48  | 17          | 28 | 46  |               |        | ☉'s U. L. by Mr. Green.  |                      |
| ♂ — 13.                      | 40                    | 29 | 0  | 23                 | 17 | 2   | 17          | 28 | 28  |               |        | ☉'s U. L. by Mr. Green.  |                      |
| 24 — 15.                     | 40                    | 34 | 0  | 23                 | 22 | 14  | 17          | 28 | 15  |               |        | ☉'s U. L. by Mr. Green.  |                      |
| h — 17.                      | 40                    | 36 | 45 | 23                 | 25 | 49  | 17          | 27 | 26  |               |        | ☉'s U. L. by Mr. Green.  |                      |
| ☉ — 18.                      | 40                    | 38 | 30 | 23                 | 26 | 58½ | 17          | 28 | 1   |               |        | ☉'s U. L. by Capt. Cook. |                      |
| ☽ — 19.                      | 40                    | 39 | 0  | 23                 | 27 | 44½ | 17          | 27 | 45  |               |        | ☉'s U. L. by Mr. Green.  |                      |
| ♂ — 20.                      | 40                    | 40 | 0  | 23                 | 28 | 6½  | 17          | 28 | 23  |               |        | ☉'s U. L. by Mr. Green.  |                      |
| ♀ — 21.                      | 40                    | 39 | 40 | 23                 | 28 | 2   | 17          | 28 | 8   |               |        | ☉'s U. L. by Mr. Green.  |                      |
| 24 — 22.                     | 40                    | 39 | 40 | 23                 | 27 | 33  | 17          | 28 | 37  |               |        | ☉'s U. L. by Mr. Green.  |                      |
| ♂ — 27.                      | 40                    | 30 | 0  | 23                 | 18 | 56½ | 17          | 27 | 33  |               |        | ☉'s U. L. by Mr. Green.  |                      |
| ☉ June 11.                   | 37                    | 51 | 57 | 20                 | 23 | 26  | 17          | 29 | 16  | 17 29 0       |        | Arcturus, by Mr. Green.  |                      |
| ♀ — 21.                      | 37                    | 53 | 0  | 20                 | 23 | 27  | 17          | 30 | 17  |               |        |                          |                      |
| 24 — 22.                     | 37                    | 50 | 0  | 20                 | 23 | 27  | 17          | 27 | 17  |               |        |                          |                      |
| h — 24.                      | 37                    | 51 | 40 | 20                 | 23 | 28½ | 17          | 28 | 56½ |               |        |                          |                      |
| ♂ July 4.                    | 37                    | 52 | 0  | 20                 | 23 | 29½ | 17          | 29 | 15  | 17 29 42      |        | α Lyrae, by Mr. Green.   |                      |
| h June 24.                   | 56                    | 3  | 20 | 38 34 52½          |    |     | 17          | 29 | 52  |               |        |                          |                      |
| ♂ — 27.                      | 56                    | 3  | 00 |                    |    |     | 17          | 29 | 32  |               |        |                          |                      |
| ♂ June 13.                   | 27                    | 32 | 30 | 10                 | 4  | 2   | 17          | 28 | 57  | 17 29 5       |        | γ Aquilæ, by Mr. Green.  |                      |
| h — 17.                      | 27                    | 33 | 34 | 10                 | 4  | 3   | 17          | 30 | 1   |               |        |                          |                      |
| h — 24.                      | 27                    | 32 | 20 | 10                 | 4  | 4   | 17          | 28 | 45½ |               |        |                          |                      |
| ♀ — 28.                      | 27                    | 32 | 12 | 10                 | 4  | 5   | 17          | 28 | 37  |               |        |                          |                      |
| ♂ June 13.                   | 25                    | 44 | 50 | 8                  | 16 | 30  | 17          | 28 | 47  | 17 28 40      |        | α Aquilæ, by Mr. Green.  |                      |
| h — 17.                      | 25                    | 44 | 53 | 8                  | 16 | 31  | 17          | 28 | 49½ |               |        |                          |                      |
| ♀ — 28.                      | 25                    | 44 | 30 | 8                  | 16 | 33  | 17          | 28 | 24½ |               |        |                          |                      |
| ♂ June 13.                   | 23                    | 19 | 22 | 5                  | 50 | 47  | 17          | 28 | 59  | 17 28 47      |        | β Aquilæ, by Mr. Green.  |                      |
| ♀ — 28.                      | 23                    | 19 | 0  | 5                  | 50 | 49½ | 17          | 28 | 35  |               |        |                          |                      |
| h June 17.                   | 61                    | 54 | 40 | 44                 | 27 | 53  | 17          | 28 | 33½ | 17 28 52      |        | α Cygni, by Mr. Green.   |                      |
| h — 24.                      | 61                    | 56 | 0  | 44                 | 27 | 55  | 17          | 29 | 51½ |               |        |                          |                      |
| ♀ — 28.                      | 61                    | 54 | 20 | 44                 | 27 | 56  | 17          | 28 | 10½ |               |        |                          |                      |
| The mean of all is - - - - - |                       |    |    |                    |    |     |             |    |     | 17 28 55½     | South. |                          |                      |

The Latitude of POINT VENUS determined from Meridional Zenith Distances of Stars which passed the Meridian to the Southward of the Zenith. Observed with the Astronomical Quadrant.

| 1769.                            | Meridional<br>Zenith Dist.       | Declination<br>South. | Latitude<br>South.               | Mean<br>Results. | Object and Observer.   |
|----------------------------------|----------------------------------|-----------------------|----------------------------------|------------------|------------------------|
|                                  | ° ' "                            | ° ' "                 | ° ' "                            | ° ' "            |                        |
| ♀ June 23.                       | 61 1 15                          | 78 33 13              | 17 29 48                         | 17 29 48         | α Hydri. Mr. Green.    |
| ♀ June 23.                       | 44 20 00                         | 61 49 39½             | 17 28 44                         | 17 28 44         | α Crucis. Mr. Green.   |
| ♂ June 21.<br>♀ — 23.            | 40 54 30<br>40 54 45             | 58 25 52              | 17 30 32½<br>17 30 17½           | 17 30 25         | β Crucis. Mr. Green.   |
| ♀ June 23.                       | 38 19 00                         |                       | 17 29 50½                        | 17 29 50½        |                        |
| ♂ June 21.<br>♂ — 24.<br>♂ — 27. | 41 44 10<br>41 44 26<br>41 44 32 | 59 15 11              | 17 30 10<br>17 29 54<br>17 29 48 | 17 29 57         | β Centauri. Mr. Green. |
| ♂ June 22.<br>♂ — 24.<br>♂ — 25. | 42 22 00<br>42 21 40<br>42 22 00 |                       | 17 29 51<br>17 30 11<br>17 29 51 |                  |                        |
| ♂ June 24.<br>♀ — 28.            | 39 57 36<br>39 56 16             | 57 26 47              | 17 28 23<br>17 29 43             | 17 29 3          | α Pavonis. Mr. Green.  |
| ♀ June 23.<br>♂ — 24.            | 30 33 40<br>30 35 00             |                       | 17 30 18<br>17 28 58             | 17 29 38         | β Gruis. Mr. Green.    |
| ♀ — 23.                          | 13 19 59                         | 30 50 00½             | 17 29 48                         | 17 29 48         | Fomalhaut. Mr. Green.  |
| The mean of all these is - - - - |                                  |                       |                                  | 17 29 41, 3      | South.                 |
| The mean of the northern stars - |                                  |                       |                                  | 17 28 55, ½      | South.                 |
| The mean of both is - - - - -    |                                  |                       |                                  | 17 29 18, 4      | South.                 |

In deducing the preceding latitudes I have taken the declinations of all the stars which passed south of the Zenith, except Fomalhaut, from the *Astronomia Fundamenta* of the *Abbé de la Caille*. The declinations of all the rest are taken from Table X. inserted at the end of the first volume of the Rev. Dr. *Maskeelyne's Astronomical Observations* made at Greenwich. The declinations of the Sun are from the *Nautical Almanac*.

The Longitude of POINT VENUS, in OTAHEITE, deduced from Observations of the Moon's Distance from the Sun and Fixed Stars, taken with HADLEY'S Sextant.

The Results of Observations taken when the Moon was West of the Sun or Star.

| ° ' "       |             |          | ° ' "      |             |              |
|-------------|-------------|----------|------------|-------------|--------------|
| ☿ April 26. | 148. 34. 15 | The Sun. | ♃ May 29.  | 149. 28. 38 |              |
|             | 149. 1. 00  |          |            | 149. 37. 22 |              |
|             | 148. 30. 22 |          |            | 149. 47. 53 |              |
|             | 148. 59. 45 |          |            | 149. 38. 7  |              |
|             | 148. 42. 15 |          | ☉ June 18. | 149. 2. 45  | Fomalhaut.   |
|             | 148. 39. 30 |          |            | 149. 21. 45 |              |
| ☉ — 30.     | 148. 57. 30 |          |            | 149. 12. 23 |              |
|             | 148. 41. 00 |          | ♀ — 23.    | 149. 18. 30 | The Sun.     |
|             | 149. 18. 00 |          |            | 149. 3. 15  |              |
|             | 148. 57. 00 |          |            | 150. 4. 45  |              |
|             | 149. 6. 15  |          |            | 150. 4. 30  |              |
|             | 148. 49. 45 |          | ♂ — 24.    | 149. 8. 37  |              |
| ♂ May 16.   | 149. 11. 30 | Antares. |            | 148. 58. 8  |              |
|             | 149. 15. 30 |          |            | 148. 58. 52 |              |
|             | 149. 15. 8  |          | ♂ — 26.    | 149. 23. 30 |              |
|             | 149. 25. 7  |          |            | 149. 22. 30 |              |
|             | 149. 4. 23  |          |            | 149. 17. 45 |              |
|             | 149. 54. 37 |          |            | 149. 28. 00 |              |
| ♀ — 26.     | 148. 8. 00  | The Sun. |            | 149. 17. 30 |              |
|             | 148. 13. 00 |          | ♂ — 27.    | 149. 13. 23 |              |
|             | 148. 26. 8  |          |            | 149. 43. 22 |              |
|             | 148. 18. 37 |          |            | 149. 17. 8  |              |
|             | 148. 34. 8  |          |            | 149. 23. 00 |              |
|             | 148. 28. 7  |          |            | 149. 30. 15 |              |
| ☉ — 28.     | 149. 54. 30 |          | ♀ — 30.    | 149. 48. 15 |              |
|             | 149. 40. 53 |          |            | 150. 9. 45  |              |
|             | 149. 34. 7  |          |            | 150. 6. 7   |              |
|             | 149. 20. 38 |          |            |             |              |
|             | 149. 13. 15 |          |            | 149. 13. 23 | W. The Mean. |
| ♂ — 29.     | 149. 42. 30 |          |            |             |              |

The Results of Observations taken when the Moon was East of the Sun or Star.

| ° ' "      |             |           | ° ' "      |              |                                      |
|------------|-------------|-----------|------------|--------------|--------------------------------------|
| ♂ May 13.  | 149. 36. 00 | The Sun.  | ♂ June 13. | 149. 10. 15  |                                      |
|            | 149. 38. 45 |           |            | 149. 31. 15  |                                      |
|            | 150. 28. 7  |           | ♂ — 17.    | 149. 5. 30   | Spica ♄.                             |
|            | 149. 52. 00 |           |            | 149. 15. 53  |                                      |
|            | 150. 41. 15 |           |            | 149. 22. 37  |                                      |
|            | 150. 28. 30 |           |            | 149. 17. 38  |                                      |
| ♂ — 16.    | 148. 28. 00 | Regulus.  |            | 149. 47. 37  |                                      |
|            | 148. 55. 00 |           |            | 149. 52. 45  |                                      |
|            | 149. 23. 8  |           | ♂ — 24.    | 150. 13. 8   | α Aquilæ.                            |
|            | 149. 45. 52 |           |            | 149. 52. 7   |                                      |
|            | 149. 26. 15 |           |            | 149. 36. 38  |                                      |
|            | 149. 21. 15 |           |            |              |                                      |
| ♂ — 29.    | 149. 2. 00  | α Aquilæ. |            | 149. 38. 22  | W. The Mean.                         |
|            | 149. 6. 30  |           |            | 149. 13. 23  | { M. of the Western<br>Observations. |
| ♂ June 12. | 151. 1. 30  | The Sun.  |            |              |                                      |
|            | 150. 22. 15 |           |            | 149. 25. 52½ | The Mean of both.                    |
|            | 150. 21. 45 |           |            | 149. 26. 37½ | By 24 Satellites. See p. 35.         |
| ♂ — 13.    | 148. 54. 38 |           |            |              |                                      |
|            | 149. 32. 37 |           |            | 149. 26. 15  | W. Long. of Point Venus.             |
|            | 149. 18. 45 |           |            |              |                                      |



By means of the bearings which are put down with the observations, and the assistance of Captain Cook's chart of the Society Islands, annexed to Dr. Hawksworth's account of these voyages, I find that the ship was  $7^{\circ} 30''$  east of Ohamaneno Harbour, in Uliatea, when the observations of the 23d of July were taken;  $6^{\circ} 30''$  east of it when the observations on the 24th were taken; and  $10^{\circ} 20''$  east of it when the observations were taken on the 26th. The mean results of the observations of these three days are  $150^{\circ} 44' 19''$  west,  $150^{\circ} 45' 34''$  west, and  $150^{\circ} 51' 45''$ ; and, consequently, the longitude of the harbour will be  $150^{\circ} 51' 49''$  west,  $150^{\circ} 52' 4''$  west, and  $151^{\circ} 2' 5''$  W. The mean of the three is  $150^{\circ} 55' 20''$  W. The mean result of the observations which were taken in the harbour, on the 8th of August, and when the moon was on the contrary side of the sun to that which it was on when the former observations were made, is  $151^{\circ} 59' 54''$  W.; and the mean of the two means is  $151^{\circ} 27' 37''$  W.

I have not attempted to determine the longitude of any other places among the Society Isles from the observations, because the bearings which are put down in the journals are by no means sufficient to do it, independent of the map which I have referred to above: and, after I have determined the longitude of Ohamaneno, any other person can determine the longitudes of the rest by means of the map as well as I can; but it may be necessary to observe in doing it, that the difference of longitude between Ohamaneno and Owharre is made too great in the map by 5 minutes; as appeared from Mr. Kendall's watch both times that we were there in the second voyage.

I shall next proceed to determine the errors which seem to have arisen in the reckoning between the Society Isles and New Zealand. Captain Cook took his departure from Ohamaneno, reckoning it to lie exactly in the same longitude that I have determined it to lie in, notwithstanding his map of the Society Isles, places it in  $151^{\circ} 23\frac{1}{2}'$  W. and his reckoning gave  $147^{\circ} 30' 00''$  W. when the observations were made on the 26th of August; consequently, as the mean result of these obser-

vations

vations is  $147^{\circ} 1' 11''$  W. the reckoning erred in excess  $28' 49''$ . The moon was west of the sun when this observation was made.

On the 6th of September the ship was in  $147^{\circ} 32' 36''$  west longitude by the reckoning, and in  $150^{\circ} 58' 30''$  W. on the 10th; and the results of the observations which were made on these two days were  $148^{\circ} 48' 30''$  west, and  $152^{\circ} 54' 00''$  W.: the moon being then east of the sun; consequently, the errors of the reckoning appear to have been  $1^{\circ} 15' 54''$ , and  $1^{\circ} 55' 30''$  in defect: the mean of these two is  $1^{\circ} 35' 42''$ ; and the mean of this mean, and the error on the 26th of August, is  $33' 26''$  in defect, which may be taken for the real error of the reckoning on the 30th of August, at noon, the day on which the moon changed.

When the observations were made on the 23d of September, the reckoning gave  $162^{\circ} 41' 18''$  W.; and the result of the observations on this day being  $152^{\circ} 54' 00''$  W. the apparent error of the reckoning is  $12' 42''$  too little. The mean of this, and  $1^{\circ} 35' 42''$ ; the apparent error of the reckoning, when the moon was east of the sun, is  $54' 12''$  in defect, which I shall take for the real error of the reckoning on the 15th of September, at noon, the day on which the moon was at full.

The longitude of the ship was  $173^{\circ} 39' 00''$  W. by the reckoning, when the observations were made on the 3d of October,  $176^{\circ} 6' 42''$  W. and  $176^{\circ} 11' 48''$  W. on the 5th;  $177^{\circ} 9' 42''$  W. on the 6th, and  $178^{\circ} 0' 21''$  W. on the 7th. The mean results of the observations made at these times are,  $178^{\circ} 35' 30''$  west,  $180^{\circ} 2' 43''$  west,  $180^{\circ} 8' 0''$  west,  $181^{\circ} 26' 25''$  west, and  $182^{\circ} 40' 20''$  W. Hence the respective errors of the reckoning appear to be  $4^{\circ} 56' 30''$ ,  $3^{\circ} 56' 1''$ ,  $3^{\circ} 56' 12''$ ,  $4^{\circ} 16' 43''$ , and  $4^{\circ} 39' 59''$ , in defect. The mean of the five, is  $4^{\circ} 21' 5''$ ; and the mean of this mean, and  $12' 42''$ , the apparent error when the moon was west of the sun, is  $2^{\circ} 16' 54''$ , which I conclude was the error of the reckoning on the 29th of September, at noon, the day on which it was new-moon.

It must not be concluded that the real error of the reckoning was so great, when the ship arrived on the coast of New Zealand, as it appears to be from the observations which were made in the beginning of October 1769; and some difficulty occurs in determining what it was; because Captain Cook's reckoning closes on the 7th, after which he kept no numerical reckoning, but determined the ship's place from time to time by means of a series of triangles, which he carried on all round the island, and which formed a continued connection of the situations of the ship with remarkable objects inland, and the principal points of the coast; and he made no farther use of the log than to connect those points of the track which the ship was in when he took his angles and bearings. For this reason, I cannot compare the observations which were made at that time with those which were made towards the latter part of the month, when the moon had passed the opposition, and was got on the other side of the sun, as I have done hitherto. It happens, however, rather fortunately, that the places of the ship, when the observations of the 6th and 7th of October were made, can be assigned on Captain Cook's chart of New Zealand, as well as by his reckoning from the Society Islands\*; and, consequently, the deviation of each from the result of the observations may be found: and the difference between these two deviations must evidently be the difference between the two reckonings, or Captain Cook's assumed error of his reckoning when he arrived on this coast.

I have already shewn, that the reckoning differed  $4^{\circ} 16' 43''$  and  $4^{\circ} 39' 59''$  from the results of these observations, the longitude by the

\* I had no better method of doing this than by working the log back from YOUNG NICK'S HEAD to the times when the observations were taken; but, as the latitudes which resulted from this operation agreed very well with the latitudes put down with the observations, it may be hoped that no material error has been committed in doing it. It must, however, be owned that the difference of longitude of the two places, found this way, does not agree so well as might be wished for, with their difference of longitude derived from Captain Cook's reckoning.

reckoning being less than the results of the observations by these quantities. The longitude of the two places, on the chart, where the observations were made, are  $180^{\circ} 40' 15''$  W. and  $181^{\circ} 13' 45''$  W.; and as the results of the observations are  $181^{\circ} 26' 25''$  west, and  $182^{\circ} 40' 20''$  west, the errors of the chart appear to be  $46' 10''$  and  $86' 35''$ ; and the two differences between these and the two errors of the reckoning are  $3^{\circ} 30' 33''$ , and  $3^{\circ} 13' 24''$ ; of which the mean of the two is  $3^{\circ} 21' 58''$ . This appears from the preceding deductions to be the quantity which Captain Cook allowed for the error of his reckoning: He tells us in his journal, that he added  $3^{\circ} 16'$  to it; but does not say how he determined it; and, therefore, I must pursue my own method. When the observations were made on the 22d of October, the ship was in the entrance into Tegadoo Bay, in longitude  $181^{\circ} 10' 15''$  west; and at anchor in Tolaga Bay, longitude  $181^{\circ} 16' 30''$  west, when the observations were made on the 23d. The mean results of the observations are  $180^{\circ} 18' 57''$  W. and  $181^{\circ} 13' 49''$  W.: consequently, the two errors are  $51' 18''$  and  $2' 41''$  too great; and the mean of them is  $2' 27''$  too great; which is the mean error of the chart, according to these observations. But I have shewn that the longitudes on the chart are greater than the longitudes, according to Captain Cook's reckoning, by  $3^{\circ} 24' 58''$ ; consequently, the error of the reckoning is  $2^{\circ} 57' 58''$  by the observations of the 22d and 23d of October: it was found to be  $4^{\circ} 21' 5''$  when the moon was east of the sun, and therefore  $3^{\circ} 39' 32''$ , the mean of the two, may be concluded to have been the real error of Captain Cook's reckoning when he arrived on the coast of New Zealand, in 1769; for it will appear, presently, that there is no reason to suppose the errors in the reckoning increased after it began to be kept on the chart.

Having determined the errors of the account in this manner every semi-lunation, I deduced the following table of the ship's place at the noon of every day from them, by supposing that a proportional part of the variation of the error in each semi-lunation happened every day.

## DEDUCTIONS FROM THE

| 1769.       | Latitude of the Ship. South.       | Longit. by Account. West. | Error of the Account.            | Longit. of the Ship corrected. West. | 1769.      | Latitude of the Ship. South.       | Longit. by Account. West. | Error of the Account.               | Longit. of the Ship corrected. West. |
|-------------|------------------------------------|---------------------------|----------------------------------|--------------------------------------|------------|------------------------------------|---------------------------|-------------------------------------|--------------------------------------|
|             | o /                                | o /                       | /                                | o /                                  |            | o /                                | o /                       | o /                                 | o /                                  |
| 24 Aug. 10. | 17. 35                             | 151. 41                   | + 0                              | 151. 41                              | h Sept. 9. | 36. 19                             | 149. 12                   | + 46 <sup>2</sup> / <sub>3</sub>    | 149. 58 <sup>2</sup> / <sub>3</sub>  |
| h — 11.     | 18. 58                             | 151. 45                   | + 1 <sup>1</sup> / <sub>2</sub>  | 151. 46 <sup>2</sup> / <sub>3</sub>  | o — 10.    | 35. 19                             | 150. 46                   | + 47 <sup>2</sup> / <sub>3</sub>    | 151. 33 <sup>2</sup> / <sub>3</sub>  |
| h — 12.     | 20. 13 <sup>2</sup> / <sub>3</sub> | 151. 36                   | + 3 <sup>1</sup> / <sub>2</sub>  | 151. 39 <sup>2</sup> / <sub>3</sub>  | o — 11.    | 34. 15                             | 152. 0                    | + 49                                | 152. 49                              |
| o — 13.     | 21. 54                             | 151. 9                    | + 5                              | 151. 14                              | h — 12.    | 33. 12                             | 152. 44                   | + 50 <sup>1</sup> / <sub>2</sub>    | 153. 34 <sup>1</sup> / <sub>2</sub>  |
| h — 14.     | 22. 26                             | 150. 55                   | + 6 <sup>2</sup> / <sub>3</sub>  | 151. 1 <sup>1</sup> / <sub>2</sub>   | h — 13.    | 32. 3                              | 153. 16                   | + 0. 51 <sup>1</sup> / <sub>2</sub> | 154. 7 <sup>1</sup> / <sub>2</sub>   |
| h — 15.     | 23. 52 <sup>1</sup> / <sub>2</sub> | 150. 37                   | + 8 <sup>1</sup> / <sub>2</sub>  | 150. 45 <sup>1</sup> / <sub>2</sub>  | h — 14.    | 32. 5                              | 153. 54                   | + 0. 52 <sup>1</sup> / <sub>2</sub> | 154. 46 <sup>1</sup> / <sub>2</sub>  |
| h — 16.     | 25. 0                              | 150. 19                   | + 10                             | 150. 29                              | h — 15.    | 32. 36                             | 156. 34                   | + 0. 54 <sup>1</sup> / <sub>2</sub> | 157. 28 <sup>1</sup> / <sub>2</sub>  |
| h — 17.     | 26. 10                             | 149. 46                   | + 11 <sup>1</sup> / <sub>2</sub> | 149. 57 <sup>1</sup> / <sub>2</sub>  | h — 16.    | 31. 44 <sup>2</sup> / <sub>3</sub> | 158. 46                   | + 1. 0 <sup>2</sup> / <sub>3</sub>  | 159. 16 <sup>2</sup> / <sub>3</sub>  |
| h — 18.     | 26. 48 <sup>1</sup> / <sub>3</sub> | 149. 42                   | + 13 <sup>1</sup> / <sub>3</sub> | 149. 55 <sup>1</sup> / <sub>3</sub>  | o — 17.    | 30. 14                             | 159. 6                    | + 1. 6                              | 160. 12                              |
| h — 19.     | 27. 40                             | 149. 6                    | + 15                             | 149. 21                              | h — 18.    | 28. 59 <sup>1</sup> / <sub>2</sub> | 159. 32                   | + 1. 11 <sup>1</sup> / <sub>2</sub> | 160. 43 <sup>1</sup> / <sub>2</sub>  |
| o — 20.     | 28. 23 <sup>1</sup> / <sub>2</sub> | 148. 25                   | + 16 <sup>1</sup> / <sub>2</sub> | 148. 41 <sup>1</sup> / <sub>2</sub>  | h — 19.    | 29. 0                              | 159. 25                   | + 1. 17 <sup>1</sup> / <sub>2</sub> | 160. 42 <sup>1</sup> / <sub>2</sub>  |
| h — 21.     | 29. 44                             | 148. 22                   | + 18 <sup>1</sup> / <sub>2</sub> | 148. 40 <sup>1</sup> / <sub>2</sub>  | h — 20.    | 29. 21 <sup>1</sup> / <sub>2</sub> | 159. 47                   | + 1. 23 <sup>1</sup> / <sub>2</sub> | 161. 10 <sup>1</sup> / <sub>2</sub>  |
| h — 22.     | 31. 4 <sup>1</sup> / <sub>2</sub>  | 148. 0                    | + 20                             | 148. 20                              | h — 21.    | 29. 56 <sup>1</sup> / <sub>2</sub> | 160. 42                   | + 1. 29 <sup>1</sup> / <sub>2</sub> | 162. 11 <sup>1</sup> / <sub>2</sub>  |
| h — 23.     | 32. 6 <sup>1</sup> / <sub>2</sub>  | 147. 29                   | + 21 <sup>1</sup> / <sub>2</sub> | 147. 50 <sup>1</sup> / <sub>2</sub>  | h — 22.    | 31. 7 <sup>1</sup> / <sub>2</sub>  | 161. 35                   | + 1. 35 <sup>1</sup> / <sub>2</sub> | 163. 10 <sup>1</sup> / <sub>2</sub>  |
| h — 24.     | 32. 44                             | 147. 10                   | + 22 <sup>1</sup> / <sub>2</sub> | 147. 32 <sup>1</sup> / <sub>2</sub>  | h — 23.    | 31. 58 <sup>1</sup> / <sub>2</sub> | 162. 44                   | + 1. 41 <sup>1</sup> / <sub>2</sub> | 164. 25 <sup>1</sup> / <sub>2</sub>  |
| h — 25.     | 32. 20 <sup>2</sup> / <sub>3</sub> | 147. 32                   | + 25 <sup>2</sup> / <sub>3</sub> | 147. 57 <sup>2</sup> / <sub>3</sub>  | h — 24.    | 33. 18                             | 162. 51                   | + 1. 47 <sup>1</sup> / <sub>2</sub> | 164. 38 <sup>1</sup> / <sub>2</sub>  |
| h — 26.     | 32. 40                             | 147. 30                   | + 26 <sup>1</sup> / <sub>2</sub> | 147. 56 <sup>1</sup> / <sub>2</sub>  | h — 25.    | 34. 32 <sup>1</sup> / <sub>2</sub> | 165. 10                   | + 1. 53 <sup>1</sup> / <sub>2</sub> | 167. 3 <sup>1</sup> / <sub>2</sub>   |
| o — 27.     | 33. 36                             | 147. 25                   | + 28 <sup>1</sup> / <sub>2</sub> | 147. 53 <sup>1</sup> / <sub>2</sub>  | h — 26.    | 36. 9                              | 167. 14                   | + 1. 59 <sup>1</sup> / <sub>2</sub> | 169. 13 <sup>1</sup> / <sub>2</sub>  |
| h — 28.     | 35. 34                             | 147. 25                   | + 30 <sup>1</sup> / <sub>2</sub> | 147. 55 <sup>1</sup> / <sub>2</sub>  | h — 27.    | 37. 34                             | 168. 10                   | + 2. 5 <sup>1</sup> / <sub>2</sub>  | 170. 15 <sup>1</sup> / <sub>2</sub>  |
| h — 29.     | 37. 0                              | 147. 21                   | + 31 <sup>1</sup> / <sub>2</sub> | 147. 52 <sup>1</sup> / <sub>2</sub>  | h — 28.    | 38. 57 <sup>1</sup> / <sub>2</sub> | 169. 5                    | + 2. 11                             | 171. 16                              |
| h — 30.     | 38. 21 <sup>1</sup> / <sub>2</sub> | 147. 6                    | + 33 <sup>1</sup> / <sub>2</sub> | 147. 39 <sup>1</sup> / <sub>2</sub>  | h — 29.    | 38. 29                             | 170. 14                   | + 2. 16 <sup>1</sup> / <sub>2</sub> | 172. 30 <sup>1</sup> / <sub>2</sub>  |
| h — 31.     | 39. 31 <sup>1</sup> / <sub>2</sub> | 147. 0                    | + 34 <sup>1</sup> / <sub>2</sub> | 147. 34 <sup>1</sup> / <sub>2</sub>  | h — 30.    | 38. 25 <sup>1</sup> / <sub>3</sub> | 172. 20                   | + 2. 27 <sup>1</sup> / <sub>3</sub> | 174. 47 <sup>1</sup> / <sub>3</sub>  |
| h Sept. 1.  | 40. 12                             | 146. 29                   | + 36                             | 147. 5                               | o Octo. 1. | 37. 45                             | 172. 36                   | + 2. 37 <sup>1</sup> / <sub>3</sub> | 175. 13 <sup>1</sup> / <sub>3</sub>  |
| h — 2.      | 39. 43                             | 145. 39                   | + 37 <sup>1</sup> / <sub>3</sub> | 146. 16 <sup>1</sup> / <sub>3</sub>  | h — 2.     | 37. 10                             | 172. 54                   | + 2. 48                             | 175. 42                              |
| o — 3.      | 39. 6                              | 145. 39                   | + 38 <sup>1</sup> / <sub>3</sub> | 146. 17 <sup>1</sup> / <sub>3</sub>  | h — 3.     | 36. 54 <sup>1</sup> / <sub>3</sub> | 173. 27                   | + 2. 58 <sup>1</sup> / <sub>3</sub> | 176. 25 <sup>1</sup> / <sub>3</sub>  |
| h — 4.      | 38. 32 <sup>1</sup> / <sub>3</sub> | 145. 32                   | + 39 <sup>1</sup> / <sub>3</sub> | 146. 11 <sup>1</sup> / <sub>3</sub>  | h — 4.     | 37. 43 <sup>1</sup> / <sub>3</sub> | 175. 0                    | + 3. 8 <sup>1</sup> / <sub>3</sub>  | 178. 8 <sup>1</sup> / <sub>3</sub>   |
| h — 5.      | 37. 52                             | 146. 2                    | + 41 <sup>1</sup> / <sub>3</sub> | 146. 43 <sup>1</sup> / <sub>3</sub>  | h — 5.     | 38. 24 <sup>1</sup> / <sub>3</sub> | 176. 3                    | + 3. 19 <sup>1</sup> / <sub>3</sub> | 179. 22 <sup>1</sup> / <sub>3</sub>  |
| h — 6.      | 37. 50                             | 147. 30                   | + 42 <sup>1</sup> / <sub>3</sub> | 148. 12 <sup>1</sup> / <sub>3</sub>  | h — 6.     | 39. 11                             | 177. 2                    | + 3. 29 <sup>1</sup> / <sub>3</sub> | 180. 31 <sup>1</sup> / <sub>3</sub>  |
| h — 7.      | 37. 52                             | 147. 49                   | + 43 <sup>1</sup> / <sub>3</sub> | 148. 32 <sup>1</sup> / <sub>3</sub>  | h — 7.     | 38. 58                             | 177. 54                   | + 3. 39 <sup>1</sup> / <sub>3</sub> | 181. 33 <sup>1</sup> / <sub>3</sub>  |
| h — 8.      | 36. 36                             | 147. 40                   | + 45 <sup>1</sup> / <sub>3</sub> | 148. 25 <sup>1</sup> / <sub>3</sub>  |            |                                    |                           |                                     |                                      |

To this account of the run, from the Society's Isles to New Zealand, I have only to add, that on the 14th of August, at noon, when the latitude of the ship was  $22^{\circ} 26'$  south, and its longitude, according to Captain Cook's reckoning,  $150^{\circ} 55' W.$ ; the highest part of the Island of OHETEROA bore E.  $\frac{1}{4}$  S. and was distant about 4 leagues; consequently, the latitude of this part of the Island is  $22^{\circ} 26' \frac{2}{3} S.$  and its longitude, according to the reckoning,  $150^{\circ} 42' 3'' W.$ ; to which if there

there be added  $6' 41''$ , the error of the reckoning at that time, according to the foregoing table, the result will be  $150^{\circ} 48' 44''$  west, the longitude of the island.

I have already observed, that Captain Cook kept no numerical reckoning on the Coast of New Zealand; and none of the owners of the many journals and log-books, which I was furnished with by the Admiralty, kept a reckoning of any kind: I was, therefore, under the necessity of making use of Captain Cook's chart of that country, for the purpose of reducing a number of observations, taken when the moon was on different sides of the sun, to the same point. But, in comparing the copy of this map, which is annexed to Dr. Hawksworth's account of these voyages, with the log-books, it was found that many of the shorter traverses had been thrown into one, in reducing the map to a proper scale for engraving from; and, as this happened in several instances, at places where the observations had been made, and which would therefore have introduced very considerable errors into the deductions, it was thought best to have the charts of New Zealand and New Holland reduced and engraved over again, from the original drawings, in the most accurate manner, and to introduce those parts of the ship's track which had been omitted before, as of small consequence; but which became necessary to the present purpose. In performing this, I have discovered and rectified several little inaccuracies, which had slipped into the former plate; of no very great importance it is true, but which must nevertheless, have perplexed those who compared the narrative with the chart. The most material of them is in the ship's track from Poverty Bay, in New Zealand, to Cape Turnagain, and back to Tolaga Bay.

The method which I have pursued in determining the errors of the chart, and from thence the true situations of the several points of land which they failed past, is so very similar to that which I have hitherto pursued by means of the reckoning, that it may be explained in a few words.

I first

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I first marked the places on the chart which the ship was in, when each lunar observation was made, by a small cross (×). These points were ascertained, in general, by the intersection of the ship's track with the parallel of latitude which she was in when the observation was made. In those few instances where the parallel of latitude made too acute an angle with the track to determine the point accurately, it has been determined by the intersection of the track with the bearing of some point of land, taken at the time when the observation was made; and when a proper bearing for the purpose was not found, by setting off the number of miles which the ship had run between the time of the observation and that when she last altered her course, or between the time of the observation and that when she next altered it, according as one or the other happened nearest to the time of observation. But the instances in which the point was not found by means of the latitude, do not exceed three or four in either chart; and I had reason to be very well satisfied with the means which offered themselves for determining these few. The points being marked on the chart, the longitudes of these points were found, and the difference between the longitude of each point and the mean result of the observations which were made at it taken, as they stand in the following table.

| 1769.      | Long. by the Observations. |             | Longitude by the Chart. | Errors of the Chart. | 1769.      | Long. by the Observations. |             | Longitude by the Chart. | Errors of the Chart. |
|------------|----------------------------|-------------|-------------------------|----------------------|------------|----------------------------|-------------|-------------------------|----------------------|
|            | °                          | '           | °                       | '                    |            | °                          | '           | °                       | '                    |
| October 6. | 181.                       | 26. 25      | 180.                    | 40. 15               | + 46. 10   | Decem. 22.                 | 187. 10. 52 | 187. 48. 30             | — 37. 38             |
| 7.         | 182.                       | 40. 20      | 181. 13. 45             | + 86. 35             | 1770.      |                            |             |                         |                      |
| 22.        | 180.                       | 18. 57      | 181. 10. 15             | — 51. 18             | January 1. | 188. 46. 6                 | 187. 21. 0  | + 85. 6                 |                      |
| 23.        | 181. 13. 49                | 181. 16. 30 | — 2. 41                 |                      | 3.         | 187. 28. 7                 | 187. 2. 0   | + 26. 7                 |                      |
| Novem. 1.  | 183. 36. 34                | 182. 49. 30 | + 47. 4                 |                      | 14.        | 185. 6. 0                  | 184. 47. 0  | + 19. 0                 |                      |
| 3.         | 184. 23. 3                 | 183. 54. 15 | + 28. 48                |                      | 16.        | 185. 0. 32                 | 184. 55. 30 | + 5. 2                  |                      |
| 17.        | 183. 18. 12                | 184. 28. 30 | — 70. 18                |                      | 17.        | 184. 14. 25                | 184. 55. 30 | — 41. 5                 |                      |
| 19.        | 183. 33. 53                | 184. 19. 30 | — 45. 37                |                      | 18.        | 184. 25. 15                | 184. 55. 30 | — 30. 15                |                      |
| 21.        | 183. 24. 37                | 184. 25. 00 | — 60. 23                |                      | 19.        | 184. 17. 50                | 184. 55. 30 | — 37. 40                |                      |
| 23.        | 183. 52. 0                 | 184. 34. 30 | — 42. 30                |                      | 20.        | 184. 21. 50                | 184. 55. 30 | — 33. 40                |                      |
| Decem. 1.  | 185. 58. 35                | 185. 36. 30 | + 22. 5                 |                      | Febru. 13. | 185. 47. 0                 | 185. 27. 30 | + 19. 30                |                      |
| 3.         | 186. 14. 9                 | 185. 36. 30 | + 37. 39                |                      | 15.        | 186. 45. 19                | 186. 12. 0  | + 33. 19                |                      |
| 4.         | 185. 5. 52                 | 185. 36. 30 | — 30. 38                |                      | 16.        | 187. 15. 5                 | 186. 24. 15 | + 50. 50                |                      |
| 5.         | 185. 18. 34                | 185. 33. 0  | — 14. 26                |                      | 20.        | 187. 7. 5                  | 188. 10. 0  | — 62. 55                |                      |
| 6.         | 186. 4. 25                 | 185. 30. 30 | + 33. 55                |                      | March 3.   | 188. 58. 15                | 187. 56. 15 | + 62. 0                 |                      |
| 7.         | 186. 15. 15                | 185. 42. 0  | + 33. 15                |                      | 4.         | 190. 44. 5                 | 189. 42. 0  | + 62. 5                 |                      |
| 8.         | 186. 34. 0                 | 186. 1. 30  | + 32. 30                |                      | 17.        | 189. 40. 5                 | 189. 13. 0  | + 27. 5                 |                      |
| 17.        | 185. 42. 45                | 186. 46. 15 | — 63. 30                |                      | 18.        | 188. 18. 57                | 188. 15. 0  | + 3. 57                 |                      |
| 20.        | 186. 21. 2                 | 187. 21. 0  | — 59. 58                |                      | 22.        | 186. 49. 0                 | 186. 28. 0  | + 21. 0                 |                      |



When the observations were taken on the 6th and 7th of October, the moon was on the east side of the sun, and the mean of the two errors is  $66' 22''\frac{1}{2}$  in defect: when those of the 22d and 23d were taken, the moon was west of the sun, and the mean of the two errors is  $26' 59''\frac{1}{2}$  in excess; the mean of the two means is  $19' 41''\frac{1}{2}$  in defect, which I suppose to have been the real error of that point of the chart which the ship was in on the 14th of October, at noon, the day on which the full moon happened.

On the 1st and 3d of November, the moon being then on the east side of the sun, the apparent errors of the chart are  $47' 4''$ , and  $28' 48''$  in defect; the mean of them is  $37' 56''$ ; and the mean of this mean, and that which happened when the moon was west of the sun, ( $26' 59''\frac{1}{2}$  in excess) is  $5' 28''$  in defect, for the error of the chart at the point which the ship was in on the 29th of October, at noon, the day which the new moon happened on.

At the time when the observations were taken on the 17th, 19th, 21st, and 23d of November the moon was again west of the sun, and the mean of the four errors, as they stand in the table, is  $54' 42''$  in excess; and the mean of this quantity, and  $37' 56''$  in defect, the mean error when the moon was east of the sun, is  $8' 23''$  in excess, which may be taken for the real error of that point of the chart which the ship was in on the 13th of November, the day of the full moon.

On the 1st, 3d, 4th, 5th, 6th, 7th and 8th of December, the moon being then east of the sun, the errors are  $22' 5''$ ,  $37' 39''$ ,  $33' 15''$ , and  $32' 30''$  in defect, and  $30' 38''$ , and  $14' 26''$  in excess: the mean of them is  $16' 20''$  in defect; and the mean of this and  $54' 42''$ , the error in excess when the moon was west of the sun, is  $19' 10''$  in excess, which I shall take for the real error of the chart at the point which the ship was in on the 27th of November, at noon, the day which the new moon happened on.



. December the 17th, 20th and 22d, the moon was west of the sun, and the mean of the three errors as appears from the table, is  $53' 42''$  in excess: the mean of this and  $16' 20''$  in defect, the error when the moon was east of the sun, is  $18' 41''$  in excess; and this I suppose to be the error of the chart at the point which the ship was in on the 12th of December, at noon, the day of the full moon.

The errors, when the observations were made on the 1st and 3d of January, 1770, appear to be  $85' 6''$ , and  $26' 7''$  in defect, and the mean of them is  $55' 36''$  in defect: the moon was at this time on the eastern side of the sun; and the mean of this mean and  $53' 42''$  in excess, the apparent error when the moon was west of the sun, is  $0' 57''$  in defect, the real error of the chart at the point the ship was in on the 27th of December, the day of the new moon.

The errors on the 14th and 16th of January are  $19' 00''$  and  $5' 2''$  in defect; and on the 17th, 18th, 19th, and 20th, the errors are  $41' 5''$ ,  $30' 15''$ ,  $37' 40''$ , and  $33' 40''$  in excess; the mean of these six is  $19' 46''$  in excess: and the mean of this mean, and that of the errors when the moon was east of the sun is  $17' 55''$  in defect; and this I take to be the error of the chart at the point the ship was in on the 11th of January at noon, the day of the full moon.

It is much to be regretted that no observations were made while the moon was on the east side of the sun, between the 26th of January, 1770, and the 9th of February following; as, by this defect, we lose the opportunity of determining the errors of the chart at the points the ship was in on these two days. Beside, as the ship was at anchor in Queen Charlotte's Sound on the former of them, it is highly probable such observations would have wholly removed, or, at least, greatly lessened the error which *now* evidently exists in the chart at that place, and those which lie in the neighbourhood of it.

The mean error of the chart, according to the observations which were made on the 13th, 15th, 16th and 20th of February, at which time the moon was on the west side of the sun, is  $10' 11''$  in defect: and the mean error of it which results from the observations made on the 3d and 4th of March, when the moon was east of the sun, is  $62' 3''$  in defect; consequently, the real error of the chart at the point the ship was in on the 25th of February, the day which the new moon happened on, is  $36' 7''$  in defect.

On the 17th, 18th, and 22d of March, the moon being then west of the sun, the errors of the chart appear to be  $27' 5''$ ,  $3' 57''$ , and  $21' 0''$  in defect; and the mean of them is  $17' 21''$  in defect: the mean of this mean and that which resulted from the observations made when the moon was east of the sun, is  $39' 42''$  in defect; and may be taken for the error of that point of the chart which the ship was in on the 11th of March, at noon, the day when the full moon happened.

The errors of the chart being determined, in this manner, for the points which the ship was in on the noons of the days when the new and full moons happened; these places were found in the same manner as those which the ship was in at the times when the observations were made: and the places are distinguished by a cross ( $\times$ ) and the day of the month. The errors of the chart, at those points which the ship was in on the intermediate days at noon, were derived from those, by supposing that a proportional part of the variation of the error between each semi-lunation, happened every day that the ship was under sail: and these errors are contained in the following table.

## DEDUCTIONS FROM THE

| 1769.    | Errors of the Chart. | 1769.    | Errors of the Chart. | 1770.   | Errors of the Chart. | 1770.    | Errors of the Chart. |
|----------|----------------------|----------|----------------------|---------|----------------------|----------|----------------------|
|          | " "                  |          | " "                  |         | " "                  |          | " "                  |
| Octo. 6. | + 19.41              | Nov. 19. | — 13. 2              | Jan. 2. | + 7.45               | Feb. 14. | + 27.30              |
| — 7.     | + 19.41              | — 20.    | — 13.48              | — 3.    | + 8.53               | — 15.    | + 28.17              |
| — 8.     | + 19.41              | — 21.    | — 14.34              | — 4.    | + 10. 1              | — 16.    | + 29. 4              |
| — 9.     | + 19.41              | — 22.    | — 15.20              | — 5.    | + 11. 9              | — 17.    | + 29.51              |
| — 10.    | + 19.41              | — 23.    | — 16. 6              | — 6.    | + 12.17              | — 18.    | + 30.38              |
| — 11.    | + 19.41              | — 24.    | — 16.52              | — 7.    | + 13.25              | — 19.    | + 31.25              |
| — 12.    | + 19.41              | — 25.    | — 17.38              | — 8.    | + 14.33              | — 20.    | + 32.12              |
| — 13.    | + 19.41              | — 26.    | — 18.24              | — 9.    | + 15.41              | — 21.    | + 32.59              |
| * 14.    | + 19.41              | * 27.    | — 19.10              | — 10.   | + 16.48              | — 22.    | + 33.46              |
| — 15.    | + 18. 7              | — 28.    | — 19. 7              | * 11.   | + 17.55              | — 23.    | + 34.33              |
| — 16.    | + 16.33              | — 29.    | — 19. 4              | — 12.   | + 18.43              | — 24.    | + 35.20              |
| — 17.    | + 14.58              | — 30.    | — 19. 1              | — 13.   | + 19.31              | * 25.    | + 36. 7              |
| — 18.    | + 13.23              | Dec. 1.  | — 18.58              | — 14.   | + 20.19              | — 26.    | + 36.22              |
| — 19.    | + 11.48              | — 2.     | In the               | — 15.   | + 21. 7              | — 27.    | + 36.37              |
| — 20.    | + 10.13              | — 3.     | Bay of               | — 16.   |                      | — 28.    | + 36.52              |
| — 21.    | + 8.38               | — 4.     | Islands.             | — 17.   |                      | Mar. 1.  | + 37. 7              |
| — 22.    | + 7. 3               | — 5.     | — 18.55              | — 18.   |                      | — 2.     | + 37.22              |
| — 23.    | + 5.28               | — 6.     | — 18.53              | — 19.   |                      | — 3.     | + 37.38              |
| — 24.    |                      | — 7.     | — 18.51              | — 20.   |                      | — 4.     | + 37.54              |
| — 25.    |                      | — 8.     | — 18.49              | — 21.   |                      | — 5.     | + 38.10              |
| — 26.    |                      | — 9.     | — 18.47              | — 22.   |                      | — 6.     | + 38.26              |
| — 27.    |                      | — 10.    | — 18.45              | — 23.   |                      | — 7.     | + 38.42              |
| — 28.    |                      | — 11.    | — 18.43              | — 24.   |                      | — 8.     | + 38.57              |
| * 29.    | + 5.28               | * 12.    | — 18.41              | — 25.   |                      | — 9.     | + 39.12              |
| — 30.    | + 2.42               | — 13.    | — 17.23              | — 26.   |                      | — 10.    | + 39.27              |
| — 31.    | + 0. 4               | — 14.    | — 16. 5              | — 27.   |                      | — 11.    | + 39.42              |
| Nov. 1.  | — 2.50               | — 15.    | — 14.47              | — 28.   |                      | — 12.    | + 39. 7              |
| — 2.     | — 5.36               | — 16.    | — 15.29              | — 29.   |                      | — 13.    | + 38. 7              |
| — 3.     | — 5.22               | — 17.    | — 12.11              | — 30.   |                      | — 14.    | + 37. 7              |
| — 4.     |                      | — 18.    | — 10.53              | — 31.   |                      | — 15.    | + 36. 7              |
| — 5.     |                      | — 19.    | — 9.35               | Feb. 1. |                      | — 16.    | + 35. 7              |
| — 6.     |                      | — 20.    | — 8.16               | — 2.    |                      | — 17.    | + 34. 7              |
| — 7.     |                      | — 21.    | — 6.57               | — 3.    |                      | — 18.    | + 33. 7              |
| — 8.     |                      | — 22.    | — 5.38               | — 4.    |                      | — 19.    | + 32. 7              |
| — 9.     |                      | — 23.    | — 4.19               | — 5.    |                      | — 20.    | + 31. 7              |
| — 10.    |                      | — 24.    | — 3. 0               | — 6.    |                      | — 21.    | + 30. 7              |
| — 11.    |                      | — 25.    | — 1.41               | — 7.    | + 21.55              | — 22.    | + 29. 7              |
| — 12.    |                      | — 26.    | — 0.22               | — 8.    | + 22.43              | — 23.    | + 28. 7              |
| * 13.    | — 8.23               | * 27.    | + 0.57               | — 9.    | + 23.31              | — 24.    | + 27. 7              |
| — 14.    | — 9.10               | — 28.    | + 2. 5               | — 10.   | + 24.19              | — 25.    | + 26. 7              |
| — 15.    | — 9.57               | — 29.    | + 3.13               | — 11.   | + 25. 7              | — 26.    | + 25. 7              |
| — 16.    | — 10.44              | — 30.    | + 4.21               | — 12.   | + 25.55              | — 27.    | + 24. 7              |
| — 17.    | — 11.30              | — 31.    | + 5.29               | — 13.   | + 26.43              |          |                      |
| — 18.    | — 12.16              | Jan. 1.  | + 6.37               |         |                      |          |                      |

The days of the full and change are marked with asterisks in this table.

I shall now shew the use of the foregoing table, by deducing the situations of some of the principal points, harbours, and islands, which are on the coast of New Zealand from the chart, and the bearings and distances which I find in the journals, by means of it.

YOUNG NICK'S HEAD, the first point of land they saw, is in latitude  $38^{\circ} 43'$  south, and longitude  $181^{\circ} 38'$  west by the chart: the error of that part of the chart is  $19' 41''$  in defect; and, consequently, the longitude of Young Nick's Head is  $181^{\circ} 57' 41''$  W. according to this mode of determining its situation. But it is remarkable that all the journals concur in saying that this Point bore N.  $10^{\circ}$ , or  $11^{\circ}$  W. at noon, on the 11th of October, 1769, and Captain Cook adds, "it was distant 3 or 4 leagues, and that Table Cape bore due south." The journals vary in their accounts of the latitude observed that day, from  $39^{\circ} 13'$  to  $39^{\circ} 16'$  south; but Mr. Green's meridional altitude of the sun's L.L. when properly worked, gives the latitude of the ship  $39^{\circ} 15'$  S. and the point of the chart where that parallel crosses the track is in longitude  $181^{\circ} 41' 30''$  W. The above-mentioned bearing and distance gives  $11\frac{1}{2}$  difference of latitude, and  $3' 12''$  difference of longitude; so that, according to these data, the latitude of Young Nick's Head, is  $39^{\circ} 3\frac{1}{4}'$  S. and its longitude, by the chart,  $181^{\circ} 44' 42''$  west; and if to this there be added  $19' 41''$ , the error of the chart in this part of it, the true longitude of this Point will be  $182^{\circ} 4' 23''$  W. It may appear extraordinary to reject an observation against which no complaint is made by the observer; but I am nevertheless of opinion, that a mistake of 20 minutes has been committed in this; and that, instead of the meridional altitude being  $57^{\circ} 59'$ , it ought to have been  $58^{\circ} 19'$ , and the latitude  $38^{\circ} 55'$ ; in which case it would agree very well, not only with the chart, but with the observations which were made on the subsequent days also, which, at present, it will not do.

The observed latitude was  $39^{\circ} 21\frac{1}{2}'$  S. on the 12th, at noon; at which time TABLE CAPE bore N.  $20^{\circ}$  E. distant 4 leagues; and the Island of PORTLAND bore south  $70^{\circ}$  W. distant about 3 miles. Hence, Table Cape appears to have been  $15'$  to the northward, and  $7'$  in longitude

gitude to the eastward of the ship, at that time: the latitude of Table Cape is, therefore,  $39^{\circ} 6' \frac{2}{3}$  S. And as the parallel of  $39^{\circ} 21' \frac{2}{3}$  cuts the tract in longitude  $181^{\circ} 45'$  west, the longitude of the Cape (adding  $19' 41''$  for the error of the chart) will be  $181^{\circ} 57' 41''$  W. The bearing and distance of the Island of Portland, places it  $1'$  to the southward, and  $3' 36''$ , in longitude, to the westward of the ship. It is therefore in the latitude of  $39^{\circ} 22' \frac{2}{3}$  south, and (making the same allowance for the error of the chart) in  $182^{\circ} 8' 17''$  W. longitude.

On the 15th, at noon, the observed latitude was  $39^{\circ} 48' \frac{2}{3}$  south, and the longitude of the point where this parallel cuts the track on the chart, is  $182^{\circ} 27'$  W. At this time CAPE KIDNAPPERS, bore N.  $9^{\circ}$  E. and was distant 6 miles. Hence, the Cape was  $5' 56''$  north, and  $1' 12''$  in longitude east of the ship; and consequently, adding  $18' 7''$  for the error of the chart in longitude, is in latitude  $39^{\circ} 42' 44''$  south, and longitude  $182^{\circ} 43' 55''$  W.

On the 16th, at noon, the observed latitude was  $40^{\circ} 32' \frac{1}{2}$  south, and the longitude of the point on the chart where this parallel cuts the track is  $182^{\circ} 51' 45''$  W. CAPE TURNAGAIN now bore due west, and was 2 miles from the ship: consequently, allowing  $16' 33''$  for the error of the chart, the longitude of this Cape is  $183^{\circ} 10' 58''$  W. Its latitude is that of the ship.

The observed latitude was  $39^{\circ} 51' \frac{1}{2}$  south, at noon, on the 17th; and the longitude by the chart, determined in the usual manner, was  $182^{\circ} 16'$  W. After this they ran west  $9 \frac{1}{4}$  miles, and W.N.W.  $3 \frac{1}{4}$  miles, and then Cape Kidnappers bore N.  $33^{\circ}$  west, and was distant 5 or 6 miles. From these data, I conclude that the Cape was  $6' 28''$  north, and  $21' 24''$  in longitude west of the ship at noon. Hence, therefore, the latitude of the Cape is  $39^{\circ} 45' 2''$  S. and its longitude, allowing  $14' 58''$  for the error of the chart,  $182^{\circ} 52' 22''$  W. The mean of this determination and the former, gives latitude  $39^{\circ} 43' 53''$  S. and longitude  $182^{\circ} 48' 8''$  W. But I think the first determination is rather more to be depended

ended on, as the ship was much nearer the Cape when the observations were made.

he observed latitude was  $39^{\circ} 34' 15''$  S. on the 18th, at noon, and longitude of the ship, according to the chart,  $182^{\circ} 7' 45''$  W. The bearing of Portland now bore N. E.  $\frac{1}{2}$  E. and was distant 4 leagues: consequently Portland was  $7' 37''$  north of the ship, and  $12'$  east of it in longitude; and hence the latitude of Portland is  $39^{\circ} 26' 38''$  south; allowing  $13' 23''$  for the error of the chart, in longitude  $182^{\circ} 9' 7''$ . The mean of this and the former determination, places Portland in latitude  $39^{\circ} 24' 39''$  south, and longitude  $182^{\circ} 8' 42''$  W. I think the former determination ought, in some measure, to have the preference, for the same reason that I gave the preference to the first determination of Cape Kidnappers.

On the 19th, at noon, the latitude of the ship was  $38^{\circ} 45'$  S. by observation; and the longitude of its place on the chart  $181^{\circ} 24' 40''$  W. Long Nick's Head now bore due west, and was distant "near 4 leagues." Hence the latitude of this headland is the same with that of the ship, and its longitude, reckoning the error of the chart to be  $11'$  is  $181^{\circ} 50' 40''$  W. The great disagreement which there is between the determination, and that which I derived from the observation made on the 11th of October, at noon, as well as between Captain Cook's report and it, renders my supposition that Mr. Green either read off, or wrote down his observation of that day  $20'$  too little: and if that was the case, and the latitude no more than  $38^{\circ} 55'$  S. the latitude of the headland will then be only  $39^{\circ} 43' 45''$  S. and its longitude  $181^{\circ} 55' 52''$ ; the longitude of the point on the chart where the parallel of  $38^{\circ}$  cuts the track being only  $181^{\circ} 33'$  W.

Captain Cook says he found the latitude of Tolaga Bay, in which they anchored on the 23d, at noon, to be  $38^{\circ} 22' 24''$  N. by means of the meridional zenith distance of the sun, on the 24th, taken with the astronomical quadrant. The longitude of the ship at anchor, according to the

the chart was  $181^{\circ} 16' 30''$  W.; to which if we add  $5' 28''$  for the error of the chart at that place, it will give  $181^{\circ} 21' 58''$  W. for the true longitude of Tolaga Bay.

The observed latitude was  $37^{\circ} 48\frac{1}{4}'$  S. on the 30th, at noon, and the ship's place on the chart, determined in the usual manner,  $180^{\circ} 59' 15''$  W. At this time the small island which lies rather more than a mile due east from the most easterly point of New Zealand bore N.  $16^{\circ}$  east, and was 4 miles from the ship. This island is, therefore,  $3' 50''$  to the north of the situation of the ship at noon, and  $1' 24''$  to the eastward of it in longitude: consequently, the latitude of this island is  $37^{\circ} 44' 25''$  south, which is also the latitude of the EAST CAPE, and the longitude of the Cape will be, as near as possible, the same with the longitude of the ship; which, by adding  $2' 42''$  for the error of the chart, will be  $181^{\circ} 1' 57''$  W.

On the 31st, at noon, CAPE RUNAWAY bore S.  $81^{\circ}$  east, and was distant about 3 miles. The latitude of the ship was then  $37^{\circ} 29\frac{1}{2}'$  S. by observation; from which it appears, that the latitude of Cape Runaway is  $37^{\circ} 30\frac{1}{2}'$  S: but its longitude cannot be determined with any precision, because no means offered themselves of finding the point of the track which the ship was in at that time.

They anchored in MERCURY BAY on the 3d of November, in the evening; and found the latitude, just within the south point of it,  $36^{\circ} 48'$  S. by means of the astronomical quadrant. According to the chart, the longitude of this point is  $184^{\circ} 2'$  W. But the error of the chart being here  $8' 22''$  in excess, the true longitude of this point is  $183^{\circ} 53' 38''$  W.

On the 18th of November, at noon, the latitude of the ship was  $36^{\circ} 28\frac{1}{2}'$  S. by observation, and its longitude on the chart  $184^{\circ} 28' 30''$  W. CAPE COLVILLE bore N.  $48^{\circ}$  E. and was distant  $5\frac{1}{2}$  miles; consequently, the latitude of this Cape is  $36^{\circ} 24\frac{3}{4}'$  south, and its longitude,

tude, allowing the error of the chart to be  $12' 16''$  in excess, is  $184^{\circ} 11' 8''$  W.

POINT RODNEY bore W. N. W. at noon, on the 24th, and was distant 2 miles: the latitude observed was  $36^{\circ} 16' \frac{1}{4}$  fouth, and the longitude on the chart  $184^{\circ} 48' 15''$  west, consequently, the latitude of Point Rodney is  $36^{\circ} 16'$  fouth, and its longitude, supposing the error of this point of the chart to be  $16' 52''$  in excess,  $184^{\circ} 33' 41''$  W.

BREAM HEAD bore due fouth, on the 25th, at noon, and was distant 10 miles; consequently, as the observed latitude was  $35^{\circ} 35' 15''$  fouth, that of Bream Head is  $35^{\circ} 45' 15''$  S. The longitude of the ship, at noon, was  $185^{\circ} 6' 15''$  W. by the chart, and the error for that day being  $17' 38''$  in excess, the true longitude of the ship, as well as the headland, is  $184^{\circ} 48' 37''$  W.

On the 26th, at noon, CAPE BRETT was due west 4 or 5 miles: the latitude observed was  $35^{\circ} 10'$  fouth, and the longitude of the ship, on the chart,  $185^{\circ} 16' 15''$  W. The error of the chart was that day  $18' 24''$  in excess; and from hence, I judge that the latitude of Cape Brett is  $35^{\circ} 10'$  fouth, and its longitude  $185^{\circ} 3' 21''$ .

The observed latitude of the ship was  $34^{\circ} 54' 10''$  fouth, on the 27th, at noon, and its longitude, on the chart,  $185^{\circ} 43' 0''$  W. CAVALLE ISLES bore S. W. by S. and was distant 4 miles: these Islands were, therefore,  $3' 20''$  fouth, and  $1' 30''$  in longitude west of the ship; and, consequently, are in the latitude of  $34^{\circ} 57' 30''$  fouth, and longitude  $185^{\circ} 25' 20''$  west, the error of the chart being, that day,  $19' 10''$  in excess, and one of the radical ones.

December the 6th, at noon, Cape Brett bore S. S. E.  $\frac{1}{2}$  E. and was distant 10 miles; consequently, the Cape was  $8' 50''$  fouth of the ship, and  $5' 45''$  east of it in longitude. The observed latitude of the ship was  $34^{\circ} 58' 30''$  fouth, and its longitude, on the chart,  $185^{\circ} 30' 30''$  W.



Hence, as the error of this part of the chart is  $18' 53''$  in excess, the longitude of Cape Brett will be  $185^{\circ} 5' 52''$  west, and its latitude  $35^{\circ} 7' 20''$  south. The mean of this determination, and that on the 26th of November, places Cape Brett in latitude  $35^{\circ} 8' 40''$  south, and longitude  $185^{\circ} 4' 37''$  W.

On the 17th of December, at noon, the NORTH CAPE bore S.  $45^{\circ}$  W. and was distant 3 miles; of course, it was  $2' 7''$  south of the ship, and  $2' 36''$  to the west of it in longitude: the observed latitude was  $34^{\circ} 19' 50''$  south, and the longitude, by the chart,  $186^{\circ} 50' 45''$  west; consequently, as the error of the chart was then  $12' 11''$  in excess, the Cape is situated in  $34^{\circ} 21' 57''$  south latitude, and  $186^{\circ} 41' 10''$  west longitude.

On the 24th, at noon, the THREE KINGS bore S.S.E. and was distant about 8 leagues. The ship was observed to be in  $33^{\circ} 49'$  south latitude, and, by the chart, in  $187^{\circ} 44' 30''$  of west longitude: and, as the error of the chart is here  $3' 00''$  in excess, the latitude of the Three Kings will be  $34^{\circ} 11'$  south, and its longitude  $187^{\circ} 30' 24''$  west.

On the 25th, at noon, the Three Kings bore N.  $82^{\circ}$  east, and was distant about 6 leagues: hence, the island was  $2' 30''$  north of the ship, and east of it, in longitude,  $21' 30''$ . The observed latitude was  $34^{\circ} 12'$  south, and the longitude, by the chart,  $188^{\circ} 2' 30''$  W.; the error of which was, this day,  $1' 41''$  in excess: consequently, the latitude of the Three Kings will be  $34^{\circ} 9' 30''$  south, and its longitude  $187^{\circ} 39' 20''$  west. The mean of the two determinations is  $34^{\circ} 10' 15''$  S. and  $187^{\circ} 34' 52''$  W.

On the 31st, at noon, CAPE MARIA VAN DIEMAN bore N.E. by north, and was distant about 5 leagues: it was, therefore,  $12' 28''$  north of the ship, and  $10' 6''$  in longitude east of it. The observed latitude of the ship was  $34^{\circ} 41' 45''$  south, and its longitude, by the chart,  $187^{\circ} 18'$  W. Hence, the latitude of Cape Maria Van Dieman is  $34^{\circ} 29' 17''$  south, and its longitude (the error of the chart being  $5' 29''$  in defect)  $187^{\circ} 13' 23''$  W.

At

At noon on the 1st of January, 1770, Cape Maria Van Dieman bore N.  $31^{\circ}$  E. and was distant  $4\frac{1}{2}$  leagues: the Cape was, therefore,  $11' 34''$  north of the ship, and  $8' 27''$  in longitude east of it. The observed latitude of the ship was  $34^{\circ} 37'$  south, and its longitude, on the chart  $187^{\circ} 22' 30''$  west: the latitude of the Cape will, therefore, be  $34^{\circ} 25' 26''$  south, and its longitude (the error of the chart being  $6' 37''$ )  $187^{\circ} 20' 40''$  W. The mean of the two determinations makes the Cape in  $34^{\circ} 27' 22''$  of south latitude, and  $187^{\circ} 17' 1''$  west longitude.

On the 13th, at noon, CAPE EGMONT bore N.E. and was distant about 4 leagues: the Cape was, therefore,  $8' 30''$  north of the ship, and  $11' 00''$  east of it in longitude; and as the ship was observed to be in the latitude of  $39^{\circ} 31' 50''$  south, and, by the chart, in  $185^{\circ} 39' 0''$  west; the latitude of the Cape will be  $39^{\circ} 23' 20''$  south, and its longitude, allowing  $19' 31''$  for the error of the chart,  $185^{\circ} 47' 31''$  west.

January the 15th, they anchored in QUEEN CHARLOTTE'S SOUND, and found the latitude, by means of the astronomical quadrant,  $41^{\circ} 5' 32''$  S. The longitude of the point where they anchored is  $184^{\circ} 55' 30''$  west, by the chart; which, as the error was  $21' 7''$  in defect on the day they anchored, will give  $185^{\circ} 16' 37''$  west, for the true longitude of the Sound.

CAPE KOAMAROO bears N.  $86^{\circ}$  E. from the place where the ship anchored in Queen Charlotte's Sound, and was distant from it  $3\frac{1}{2}$  leagues. This Cape, therefore, is  $0' 44''$  north of the anchoring place, and  $13' 40''$  east of it; and of course, is in latitude  $41^{\circ} 4' 48''$  S. and longitude  $185^{\circ} 2' 57''$  E.

February the 7th, at noon, the observed latitude of the ship was  $41^{\circ} 26' 30''$  south, and its longitude, by the chart,  $184^{\circ} 42'$  W. CAPE PALLISER bore S.  $79^{\circ}$  E. and was distant 12 leagues. Cape Koamaroo bore N.  $\frac{1}{2}$  E. and was distant 7 or 8 leagues; and CAPE TEERA-WITTEE bore N.  $62^{\circ}$  E. distant 5 leagues. Hence it will be found, that Cape  
Palliser

Pallifer was  $6' 52''$  south of the ship, and  $46' 50''$  east of it in longitude; that Cape Koamaroo was  $21' 53''$  north of the ship, and  $2' 51''$  east of it in longitude; and that Cape Teera-wittee was  $7' 2''$  north of the ship, and  $17' 34''$  east of it in longitude; consequently, the latitudes of these three Capes are  $41^{\circ} 33' 22''$  south,  $41^{\circ} 4' 37''$  south, and  $41^{\circ} 19' 28''$  south, respectively: and their longitudes, the error of the chart being  $21' 55''$  in defect,  $184^{\circ} 17' 5''$  west,  $185^{\circ} 1' 4''$  west; and  $184^{\circ} 46' 21''$  west.

On the 9th, at noon, Cape Turnagain bore N. by E. and was distant about 7 leagues: the Cape was, therefore,  $20' 36''$  north of the ship, and  $5' 24''$  east of it in longitude. The observed latitude of the ship was  $40^{\circ} 55' 50''$  south, and its longitude, by the chart, was  $183^{\circ} 6' 30''$  west: consequently, the latitude of the Cape will be  $40^{\circ} 35' 14''$  south, and its longitude  $183^{\circ} 24' 37''$  west, the error of the chart being  $23' 31''$  in defect. I have made out the situation of Cape Turnagain from these data, to try how near the two determinations would agree; but this last is far less to be depended on than the former, owing to the great distance which the ship was from the Cape when the bearing of it was taken.

I can meet with no datum, in any of the journals, which will assist me in determining the situation of CAPE CAMPBEL, the point of land which forms the western boundary of the south-east entrance of COOK STRAITS, except that it is said by Captain Cook to lie S. by W. distant 12 or 13 leagues from Cape Koamaroo; and from which it follows, that Cape Campbel lies  $36'$  to the southward, and  $1' 33''$  in longitude to the westward of Cape Koamaroo; and, consequently, is in  $41^{\circ} 40' 48''$  south latitude, and  $185^{\circ} 4' 30''$  west longitude.

On the 12th of February, at noon, Cape Pallifer bore due north, and was distant 5 leagues. The observed latitude that day was  $41^{\circ} 51' 24''$  S.; and, consequently, the latitude of Cape Pallifer is  $41^{\circ} 36' 24''$  S. The longitude of the ship was that day  $184^{\circ} 0' 30''$  W. by the chart, and as the error was then  $25' 55''$  in defect, the longitude will

will be  $184^{\circ} 26' 25''$  W. The mean of the two determinations of Cape Palliser is  $41^{\circ} 34' 53''$  S. and  $184^{\circ} 21' 45''$  W.

February the 16th, at noon, the observed latitude was  $43^{\circ} 16'$  south, and the longitude, by the chart,  $186^{\circ} 11'$  W. The northern point of Banks's Island bore S. W. by S.  $\frac{3}{4}$  west, and was distant 8 leagues: consequently, this point was  $17' 47''$  south of the ship, and  $22' 18''$  west of it in longitude; and, the error of the chart being here  $29' 4''$  in defect, the latitude of the north point of Banks's Island will be  $43^{\circ} 33' 47''$  south, and its longitude  $187^{\circ} 2' 22''$  W.

The 17th, at noon, the south point of BANKS'S ISLAND bore due north, and was distant 5 leagues: the latitude observed that day was  $44^{\circ} 7' 15''$  S. and the longitude, by the chart,  $186^{\circ} 20' 00''$  W.<sup>2</sup> Hence, as the error of the chart is here  $29' 51''$  in defect, the latitude of the south point of Banks's Island is  $43^{\circ} 52' 15''$  south, and the longitude of the same point  $186^{\circ} 49' 51''$  W. It appears to me, that there has been some inaccuracy in lying down the track of the ship in this place; but I did not think it prudent to make any alterations in it.

At noon, on the 24th, the observed latitude was  $45^{\circ} 19' \frac{2}{3}$  S. and longitude, by the chart,  $188^{\circ} 19' 30''$  W. which, corrected for the error of this day, is  $188^{\circ} 54' 50''$  W. The ship ran S.  $39^{\circ}$  W.  $18 \frac{3}{8}$  miles, S.  $50^{\circ}$  W.  $18 \frac{1}{8}$  miles, S.  $16^{\circ}$  W.  $4 \frac{3}{4}$  miles, and S.  $28^{\circ}$  W.  $4 \frac{1}{4}$  miles, to 8 o'clock in the evening; and then CAPE SAUNDERS bore S.  $61^{\circ}$  W. and was distant about 6 miles. Hence Cape Saunders lies  $38' 5''$  to the southward, and  $49' 6''$ , in longitude, to the westward of the ship's situation at noon; and, consequently, is in latitude  $45^{\circ} 57' \frac{3}{4}$  S. and longitude  $189^{\circ} 43' 56''$  W.

March the 9th, at noon, the ship was in latitude  $47^{\circ} 25' 10''$  S. by observation, and longitude  $191^{\circ} 43' 45''$  W. by the chart; which, as the correction was then  $39' 12''$ , is  $192^{\circ} 22' 57''$  W. true. The SOUTH CAPE bore N. W. by W. and was distant 5 leagues; consequently, the latitude of the South Cape is  $47^{\circ} 16' 50''$  south, and its longitude  $192^{\circ} 39' 51''$  W.

On the 11th, at noon, SOLANDER'S ISLAND bore S.  $59^{\circ}$  W. and was distant 5 leagues; consequently, the island was  $7' 43''$  to the southward of the ship, and  $18' 42''$ , in longitude, to the westward of it. The latitude observed was  $46^{\circ} 24'$  south, and the longitude, by the chart,  $192^{\circ} 28'$  W.; and, as the error of the chart was at this time  $39' 42''$ , the true longitude of the ship at noon, was  $193^{\circ} 7' 42''$  W. The longitude of Solander's Island is, therefore,  $193^{\circ} 26' 24''$  west, and its latitude  $46^{\circ} 31' \frac{1}{2}$  S.

At noon on the 13th, the observed latitude was  $46^{\circ} 00'$  south, and the longitude, by the chart,  $193^{\circ} 49' 30''$  west; after which the ship ran north  $60^{\circ}$  E.  $12\frac{1}{2}$  miles, N.  $37^{\circ}$  E.  $5\frac{1}{2}$  miles, N.  $15^{\circ}$  E.  $2\frac{1}{2}$  miles, S.  $75^{\circ}$  E. 5 miles, and N.  $26^{\circ}$  E. 9 miles, to sun-set; and then the WEST CAPE bore due south, and was distant 5 or 6 leagues. Hence, the Cape is  $3' 28''$  north of the ship's situation at noon, and  $33' 42''$ , in longitude, east of it: and, as the error of the chart is here  $38'$  in defect, the true longitude of the Cape is  $193^{\circ} 53' 48''$  west, and its latitude  $45^{\circ} 56' 13''$  south.

March the 23d, the observed latitude was  $40^{\circ} 38' 20''$  south, and the longitude, by the chart,  $186^{\circ} 24'$  W. CAPE FAREWELL bore N.  $80^{\circ}$  E. distant 7 leagues; and ROCKY POINT bore S.  $18^{\circ}$  W. distant 6 leagues. Hence, the former of these points was  $3' 38''$  N. of the ship, and  $27' 27''$  E. of it, in longitude; and the latter was  $17' 7''$  S. of the ship, and  $7' 21''$  W. of it, in longitude. The error of the chart was here  $28'$  in defect; consequently, the longitudes of these two points are  $186^{\circ} 24' 33''$  west, and  $186^{\circ} 59' 21''$  W. Their latitudes are  $40^{\circ} 34' 42''$  south, and  $40^{\circ} 55' 27''$  south.

At noon, on the 26th, STEPHEN'S ISLAND bore S. E. and was distant 4 or 5 miles; this island was, therefore,  $3' 11''$  S. of the ship, and  $4' 10''$  E. of it in longitude. The observed latitude of the ship was  $40^{\circ} 32' 15''$  south, and its longitude, by the chart,  $185^{\circ} 16' 15''$  west; the latitude of Stephen's Island is, therefore,  $40^{\circ} 35' 26''$  south, and its longitude

longitude  $185^{\circ} 37' 5''$  west, the error of the chart being  $25'$  in defect: CAPE STEPHENS lies S. W. 2 miles from Stephen's Island; and, consequently, is in latitude  $40^{\circ} 36' 50''$  south, and longitude  $185^{\circ} 38' 57''$  W.

In going into ADMIRALTY BAY, POINT JACKSON was in one with Cape Koamaroo, when they bore S.  $40^{\circ}$  E. Captain Cook, in his account of Queen Charlotte's Sound, says, they are 9 miles asunder: consequently, Point Jackson lies  $6' 53''$  to the northward, and  $7' 40''$ , in longitude, to the westward of Cape Koamaroo; and, therefore, is in latitude  $40^{\circ} 57' 55''$  south, and in longitude  $185^{\circ} 10' 37''$  W. of Greenwich. I use the first determination of Cape Koamaroo.

Captain Cook took his departure from Cape Farewell, in New Zealand, on the 31st of March, 1770, reckoning it to lie in  $40^{\circ} 33'$  S. latitude, and  $185^{\circ} 58'$  W. longitude from the meridian of Greenwich: but as I have already shewn, that the longitude of that point is  $186^{\circ} 24' 33''$  W. he must have set out with an error in his account of longitude of  $26' 33''$  in defect. They made the land of NEW HOLLAND on the 18th of April, and on the 19th, at noon, the longitude of the ship was  $210^{\circ} 22'$  W. by this reckoning, and  $210^{\circ} 25'$  W. by the Captain's chart of the eastern coast of that island, which is annexed to this work; so that it is plain he lay that part of the coast down, which he saw first, agreeable to his reckoning when he arrived on it. Indeed, the observations which were made on the 16th, 19th and 20th of April, did not authorise him to make any very considerable correction of it; but it is very clear, from the subsequent observations, that those gave the longitude of the ship too little. What the error of the reckoning really was, I shall now endeavour to determine: premising, that the error of this part of the chart must be the error of the reckoning, for the reasons given above.

Having marked the places on the chart which the ship was in when the several observations were made, found the longitudes of these places, and taken the differences between them and the mean result of the observations which were made at each place, as was done on the coast of New Zealand, I arranged them in a table, as follows:

| 1770.      | Longitude by<br>Observation. | Longitude by<br>the Chart. | Errors of the<br>Chart. | 1770.      | Longitude by<br>Observation. | Longitude by<br>the Chart. | Errors of the<br>Chart. |
|------------|------------------------------|----------------------------|-------------------------|------------|------------------------------|----------------------------|-------------------------|
|            | ° ' "                        | ° ' "                      | ' "                     |            | ° ' "                        | ° ' "                      | ' "                     |
| ♂ Apr. 16. | 207. 47. 27½                 | 208. 18. 0*                | — 30. 32½               | ♂ May 29.  | 211. 7. 35                   | 210. 21. 45                | + 45. 50                |
| ♀ — 19.    | 209. 58. 37½                 | 209. 51. 0                 | + 7. 37½                | ♂ June 12. | 214. 9. 40                   | 214. 40. 30                | — 30. 50                |
| ♀ — 20.    | 209. 14. 24                  | 209. 35. 0                 | — 20. 36                | ♂ July 15. | 213. 28. 20                  | 214. 52. 30                | — 84. 10                |
| ♂ May 1.   | 209. 11. 40                  | 208. 40. 30                | + 31. 10                | ♂ — 16.    | 214. 37. 45                  | 214. 52. 30                | — 14. 45                |
| ♀ — 2.     | 210. 20. 27                  | 208. 40. 30                | + 99. 57                | ♀ — 26.    | 215. 6. 50                   | 214. 52. 30                | + 14. 20                |
| ♀ — 3.     | 209. 18. 22½                 | 208. 40. 30                | + 37. 52½               | ♂ Aug. 13. | 213. 59. 45                  | 214. 40. 30                | — 49. 45                |
| ♀ — 4.     | 208. 50. 15                  | 208. 40. 30                | + 9. 45                 | ♂ — 14.    | 214. 57. 45                  | 215. 46. 00                | — 48. 15                |
| ♂ — 14.    | 205. 41. 15                  | 206. 27. 15                | — 46. 0                 | ♀ — 15.    | 215. 44. 35                  | 216. 24. 00                | — 39. 25                |
| ♂ — 15.    | 205. 21. 0                   | 206. 21. 00                | — 60. 0                 | ♀ — 24.    | 219. 18. 40                  | 219. 24. 0                 | — 5. 20                 |
| ♀ — 16.    | 204. 29. 55                  | 206. 36. 30                | — 126. 35               | ♂ — 25.    | 219. 11. 30                  | 219. 50. 30                | — 39. 0                 |
| ♀ — 17.    | 206. 56. 50                  | 206. 43. 30                | + 13. 20                | ♂ — 26.    | 219. 57. 0                   | 220. 26. 30*               | — 29. 30                |
| ♂ — 19.    | 206. 29. 25                  | 206. 43. 30                | — 14. 5                 | ♀ — 29.    | 221. 29. 10                  | 221. 56. 0*                | — 26. 50                |

\* These longitudes are from Captain Cook's reckoning, which is a continuation of the reckoning he had kept on the chart

From this table, I find that the mean error of the chart, according to the observations which were made on the 16th, 19th and 20th of April, when the moon was on the west side of the sun, is 14' 30" in excess. But, from the observations which were made on the 1st, 2d, 3d, and 4th of May\*, when the moon was east of the sun, the error is 44' 41" in defect: the mean of the two is 15' 6" in defect: which, I shall suppose, as usual, was the real error of the chart at that point which the ship was in on the 25th of April, the day on which the new moon happened. And this must have been nearly the error of the reckoning when they arrived on the coast; which being very little different from that which Captain Cook set out with from New Zealand, it is evident they had been very little disturbed by currents in their passage from that place.

When the observations of the 14th, 15th, 16th, 17th, and 19th of May were made, the moon was again on the west side of the sun, and the mean of the errors is 46' 40" in excess: the mean of this mean, and the mean of the errors when the moon was east of the sun, is 1' 00' in excess, which may be taken for the error of that point of the chart which the ship was in on the 9th of May, when it was full moon.

\* The ship was at anchor in Botany Bay when these four observations were made.

According

According to the observation which was made on the 29th of May, when the moon was again on the east side of the sun, the error of the chart was  $45' 50''$  in defect: and the mean of this, and the error when the moon was west of the sun, is  $0' 25''$  in excess; which I take for the error of that point of the chart the ship was in on the 24 of May, when it was new moon.

By the observation of the 12th of June, when the moon was west of the sun, the error of the chart is  $30' 50''$  in excess: and the mean of this and the error of the 29th of May, is  $7' 30''$  in defect; which is the error of that point of the chart the ship was in on the 7th of June, the day of the full moon.

On the 15th and 16th of July, the moon being west of the sun, the errors of the chart appear to be  $84' 10''$  and  $14' 45''$  in excess; and the mean of them is  $49' 28''$ : but on the 26th of July, when the moon was on the east side of the sun, the error appears to be  $14' 20''$  in defect: the mean of the two is  $17' 34''$  in excess. As these observations were taken while the ship was in Endeavour River, and when the moon was on different sides of the sun, the mean of them, which is  $214^{\circ} 34' 56''$  W. ought to be the true longitude of that place: but it will appear hereafter, that there is great reason to believe the observation of the 15th was much more in defect than that of the 26th errs in excess, and that the real error of the chart, at this place, is about  $2' 30''$  in excess.

When the observations of the 13th, 14th, and 15th of August were taken, the moon was west of the sun, and the mean of the errors of the chart is  $45' 48''$  in excess: the mean of this mean, and the error on the 26th of July, is  $15' 44''$  in excess; and this is the error of that point of the chart which the ship was in on the 6th of August, when it was full moon. But as they were, at this time, not out of sight of Endeavour River, and could not possibly have altered the error of the chart so much as this seems to require, I have ventured to lessen



this error in the following table, and to make it correspond more with that which was found while the ship was in the river.

The mean of the errors which result from the observations of the 24th, 25th, 26th, and 29th of August, is  $25' 10''$  in excess, and the mean of this mean, and  $45' 48''$ , the error when the moon was on the west side of the sun, is  $35' 29''$  in excess; and this may be taken for the error of the chart on the 20th of August, the day on which the moon changed.

When the observations were made on the 9th of September, Captain Cook's reckoning gave  $232^{\circ} 42'$  W. for the longitude of the ship; the mean result of the observations of that day, is  $232^{\circ} 46' 37''\frac{1}{2}$  W.: the apparent error of the reckoning is, therefore,  $4' 37''\frac{1}{2}$  in defect. The reckoning gave  $233^{\circ} 9'$  W. when the observations were made on the 10th, and  $233^{\circ} 21'$  W. when those of the 11th were taken; and as the mean results of the observations on these two days were  $233^{\circ} 9' 55''$  W. and  $232^{\circ} 42' 20''$ , the two errors will be  $0' 55''$  in defect, and  $38' 40''$  in excess: the mean of the three is  $11' 2''\frac{1}{2}$  in excess; and the mean of this and  $25' 10''$ , the error, when the moon was on the other side of the sun, is  $18' 6''$ , the error of the reckoning on the 4th of September, the day on which the moon was full.

From these data, I derive the following table of errors, for every day the ship was under way on the coast of New Holland, in the same manner that the table for New Zealand was derived.

| 1770.     | Errors of the Chart. | 1770.   | Errors of the Chart. | 1770.   | Errors of the Chart | 1770.     | Errors of the Chart. |
|-----------|----------------------|---------|----------------------|---|---------------------|-----------|----------------------|
|           | ' "                  |         | ' "                  |   | ' "                 |           | ' "                  |
| April 19. | + 25. 36             | May 10. | — 0. 58              | May 31.   | + 3. 33             | August 5. | — 3. 0               |
| 20.       | + 23. 51             | 11.     | — 0. 56              | June 1.   | + 4. 7              | 6.        | — 3. 30              |
| 21.       | + 22. 6              | 12.     | — 0. 54              | 2.  | + 4. 41             | 7.        | — 4. 0               |
| 22.       | + 20. 21             | 13.     | — 0. 52              | 3.  | + 5. 15             | 8.        | — 4. 30              |
| 23.       | + 18. 36             | 14.     | — 0. 50              | 4.  | + 5. 49             | 9.        | — 5. 0               |
| 24.       | + 16. 51             | 15.     | — 0. 48              | 5.  | + 6. 23             | 10.       | — 5. 30              |
| * 25.     | + 15. 6              | 16.     | — 0. 46              | 6.  | + 6. 57             | 11.       | — 8. 30              |
| 26.       | + 13. 19             | 17.     | — 0. 44              | * 7.  | + 7. 30             | 12.       | — 11. 30             |
| 27.       | + 11. 32             | 18.     | — 0. 42              | 8.  | + 6. 5              | 13.       | — 14. 30             |
| 28.       | + 9. 45              | 19.     | — 0. 40              | 9.  | + 4. 40             | 14.       | — 17. 30             |
| 29.       | + 7. 58              | 20.     | — 0. 37              | 10.   | + 3. 14             | 15.       | — 20. 30             |
| 30.       |                      | 21.     | — 0. 34              | 11.   | + 1. 48             | 16.       | — 23. 30             |
| May 1.    | In Botany Bay.       | 22.     | — 0. 31              | 12.   | + 0. 22             | 17.       | — 26. 30             |
| 2.        |                      | 23.     | — 0. 28              | 13.   | — 1. 4              | 18.       | — 29. 30             |
| 3.        |                      | * 24.   | — 0. 25              | * 14.   | — 2. 30             | 19.       | — 32. 30             |
| 4.        |                      | 25.     | + 0. 9               | The ship was in Endeavour River from this time to August the 4th. |                     | * 20.     | — 35. 29             |
| 5.        | + 6. 11              | 26.     | + 0. 43              |   |                     | 21.       | — 34. 19             |
| 6.        | + 4. 24              | 27.     | + 1. 17              |   |                     | 22.       | — 33. 9              |
| 7.        | + 2. 36              | 28.     | + 1. 51              |   |                     | 23.       | — 31. 59             |
| 8.        | + 0. 48              | 29.     | + 2. 25              |   |                     | 24.       | — 30. 49             |
| * 9.      | — 1. 0.              | 30.     | + 2. 59              |   |                     | 25.       | — 29. 39             |

I have already shewn that the longitude of the ship on the 19th of April, at noon, was  $210^{\circ} 25'$  W. according to the chart. By the table, the error of the chart is  $25' 36''$  in defect at that place: consequently, the true longitude of the ship, that day at noon, was  $210^{\circ} 50' 36''$  west; and the observed latitude was  $37^{\circ} 50'$  S. They had run N.  $55^{\circ}$  E.  $5\frac{1}{4}$  miles, N.  $66^{\circ}$  E. 8 miles, and N.  $78^{\circ}$  E.  $4\frac{1}{2}$  miles from 8 o'clock in the morning, at which time POINT HICKS bore W.  $\frac{1}{4}$  S. and was distant 5 leagues. Hence, Point Hicks was  $8\frac{1}{2}$  miles to the southward, and  $39'$  in longitude to the westward of the ship's situation at noon; and, therefore, is in latitude  $37^{\circ} 58'\frac{1}{2}$  S. and longitude  $211^{\circ} 29' 36''$  W.

The same day at noon, the Ram-Head bore N.  $20^{\circ}$  east, and was distant 4 leagues: it was, therefore,  $11' 16''$  to the north, and  $5' 12''$  in longitude to the west of the ship; and, consequently, is in the latitude of  $37^{\circ} 38' 44''$  south, and longitude  $210^{\circ} 45' 24''$  W.

Reckoning

Reckoning still from the same situation, they ran east 11 miles, and N.  $33^{\circ}$  E.  $22\frac{1}{4}$  miles until 6 o'clock, and then CAPE HOWE bore due west 2 leagues. From hence it appears, that Cape Howe was  $18' 45''$  to the northward, and  $21' 33''$  in longitude to the eastward of the ship's situation at noon; and, consequently, is in latitude  $37^{\circ} 31' 15''$  S. and longitude  $210^{\circ} 29' 3''$  W. of Greenwich.

The longitude of the ship at noon, on the 24th, was  $208^{\circ} 51'$  W. by the chart, which, by the table, is  $209^{\circ} 7' 51''$  west; and the observed latitude was  $35^{\circ} 10'\frac{1}{2}$  S. At this time CAPE ST. GEORGE bore due west, and was distant 19 miles; consequently, Cape St. George is in latitude  $35^{\circ} 10' 30''$  S. and longitude  $209^{\circ} 31' 3''$  W.

On the 27th, at noon, the observed latitude was  $34^{\circ} 21'\frac{1}{4}$  S. and the longitude, by the chart,  $208^{\circ} 42'$  W. that is,  $208^{\circ} 53' 32''$  W. true. At this time RED POINT bore S.  $27^{\circ}$  W. and was distant 3 leagues; consequently, the latitude of Red Point is  $34^{\circ} 29'\frac{1}{4}$  S. and its longitude  $208^{\circ} 58' 27''$  W.

According to the chart, the longitude of BOTANY BAY is  $208^{\circ} 40' 30''$  west, and the error of the chart in that place, is  $7' 58''$  in defect; consequently, the longitude of this Bay is  $208^{\circ} 48' 28''$ . The observed latitude is  $34^{\circ} 6'$  S. The observation was made on shore, just within Point Solander.

May the 7th, at noon, CAPE THREE POINTS bore S. W. distant 5 leagues. The latitude was observed to be  $33^{\circ} 21' 30''$  S. and the ship's place on the chart, was  $208^{\circ} 19'$  W. which, as the error here is  $2' 36''$  in excess, is  $208^{\circ} 21' 36''$  W. true: and, consequently, the latitude of Cape Three Points is  $33^{\circ} 32' 6''$  south, and its longitude  $208^{\circ} 34' 21''$  W.

On the 10th, at noon, the observed latitude was  $32^{\circ} 53' 30''$  south, and the longitude, by the chart,  $208^{\circ} 2' 45''$  W. or  $208^{\circ} 1' 47''$  true, because the error is here  $58''$  in excess. They ran N.  $53^{\circ}$  E. 7 miles, and  
N.  $59^{\circ}$

N.  $59^{\circ}$  E.  $8\frac{1}{2}$  miles, and then had POINT STEPHENS due west of them, and distant 1 mile. Hence, Point Stephens was  $8' 30''$  north of the ship's situation at noon, and  $13' 48''$  in longitude east of it; and, consequently, is in latitude  $32^{\circ} 45' S.$  and longitude  $207^{\circ} 48' W.$

The 13th, at noon, SMOKY CAPE bore S.W. and was distant 4 leagues. The latitude observed that day was  $30^{\circ} 43' S.$  and the longitude on the chart,  $206^{\circ} 46'$  west, which is  $206^{\circ} 45' 8''$  true: consequently, the latitude of Smoky Cape is  $30^{\circ} 54' 18''$  south, and its longitude  $206^{\circ} 58' 20'' W.$

May the 15th, at noon, CAPE BYRON bore N.W. by W. and was distant 3 miles. The latitude of the ship was  $28^{\circ} 40' S.$  and its longitude, by the chart,  $206^{\circ} 26'$  west, which is  $206^{\circ} 25' 12''$  true: consequently, the latitude of Cape Byron is  $28^{\circ} 38' 20'' S.$  and its longitude  $206^{\circ} 28' 2'' W.$

POINT DANGER bears N.E. by E. from Mount Warning, and N.  $2^{\circ}$  E. from Cape Byron, from which it is distant 30 miles. Its latitude is, therefore,  $28^{\circ} 8' 22''$  south, and its longitude  $206^{\circ} 26' 50'' W.$

May the 16th, at noon, the latitude of the ship was observed to be  $27^{\circ} 48' 20''$  south, and its longitude was  $206^{\circ} 27' W.$  by the chart; that is,  $206^{\circ} 26' 14''$  true. At this time the point which is immediately to the southward of CAPE MORTON, bore due north; and, consequently, is in the same longitude that the ship was then in; but there are no data in the Journals from which the latitude of this point can be determined better than it can be done by the chart. This Point and Point Danger, are so nearly on the same meridian, that it is impossible to say, with certainty, which of them forms the most easterly Cape of New Holland.

CAPE MORTON bears N.  $\frac{1}{4}$  W. from the point which I have here been speaking of: but I can meet with no other datum in the journals which relates to it.

May the 20th, at noon, the observed latitude was  $24^{\circ} 26'$  south, and the longitude, by the chart,  $206^{\circ} 45'$  west, which makes  $206^{\circ} 44' 23''$  true. SANDY CAPE bore S.  $\frac{3}{4}$  W. and was distant 20 miles. The latitude of this Cape is, therefore,  $24^{\circ} 45' 48''$  south, and its longitude is  $206^{\circ} 47' 38''$  W.

The longitude of Buftard Bay, in which they were at anchor on the 23d, at noon, is  $208^{\circ} 22' \frac{1}{2}$  W. by the chart; which, as the error of the chart is there  $28''$  in excess, is  $208^{\circ} 22'$  W. true.

On the 24th, at noon, the observed latitude was  $23^{\circ} 51' 45''$  south, and the longitude, by the chart,  $208^{\circ} 36'$  west, or  $208^{\circ} 35' 35'''$  true. At this time the NORTH HEAD of Buftard Bay bore S.  $62^{\circ}$  E. and was distant 10 miles. Hence, the latitude of the North Head is  $23^{\circ} 56' 27''$  south, and its longitude is  $208^{\circ} 25' 55''$  W.

At noon, on the 25th, CAPE CAPRICORN bore S.  $60^{\circ}$  E. and was distant 2 leagues. The observed latitude of the ship was  $23^{\circ} 23' 40''$  south, and the longitude, on the chart,  $209^{\circ} 0'$  west, which is the true longitude, because the error of the chart is there nothing. Hence, the latitude of Cape Capricorn is  $23^{\circ} 26' 40''$  south, and its longitude is  $208^{\circ} 54' 20''$  W.

On the 27th, at noon, CAPE MANIFOLD bore N. N. W. and was distant 10 miles. The latitude, by observation, was  $22^{\circ} 53' 20''$  south, and the longitude, by the chart,  $209^{\circ} 18'$  west, which, as the error of the chart is here  $1' 17''$  in defect, is  $209^{\circ} 19' 17''$  true: hence, the latitude of Cape Manifold is  $22^{\circ} 44' 5''$  south, and its longitude is  $209^{\circ} 23' 27''$  W.

At noon, on the 28th, CAPE TOWNSHEND bore S.  $74^{\circ}$  E. and was distant from the ship 13 miles. The latitude observed, was  $22^{\circ} 7' 48''$  south, and the longitude, by the chart,  $210^{\circ} 3'$  west, which, adding  $1' 51''$  for the error of the chart, is  $210^{\circ} 4' 51''$ ; consequently, Cape Townshend is in latitude  $22^{\circ} 11' 23''$  south, and longitude  $209^{\circ} 57' 30''$  W.

The

The latitude observed while the ship was at anchor in THIRSTY SOUND was  $22^{\circ} 5' 30''$  south, and the longitude is  $210^{\circ} 21' W.$  by the chart: to this  $2' 59''$  must be added for the error, and it will give  $210^{\circ} 23' 59'' W.$  for the longitude of this Sound.

June the 1st, at noon, CAPE PALMERSTON bore W. by N. and was distant 3 leagues. The observed latitude was  $21^{\circ} 29' 20''$  south, and the longitude, by the chart,  $210^{\circ} 48' 30'' W.$ : if to this  $4' 7''$  be added for the error, the true longitude of the ship will be  $210^{\circ} 52' 37'' W.$ ; consequently, the latitude of Cape Palmerston is  $21^{\circ} 27' 35''$  south, and its longitude  $211^{\circ} 2' 5'' W.$

CAPE HILSBOROUGH bore W.  $\frac{1}{2}$  N. on the 2d, at noon, and was distant 7 miles. The observed latitude was  $20^{\circ} 55' 40'' S.$  and the longitude, by the chart,  $211^{\circ} 16' W.$  which, as the error is here  $4' 41''$  in defect, is  $211^{\circ} 20' 41''$  true. Hence Cape Hillsborough is in  $20^{\circ} 55' S.$  latitude, and  $211^{\circ} 28' 8'' W.$  longitude.

CAPE CONWAY, bore S.  $19^{\circ}$  west, and was distant 4 miles on the 3d of June, at noon. The latitude was  $20^{\circ} 26' 24''$  south, by observation, and the longitude  $211^{\circ} 27' W.$  by the chart; that is, as the error is here  $5' 15''$  in defect,  $211^{\circ} 32' 15''$  true: consequently, the latitude of Cape Conway is  $20^{\circ} 30' 10'' S.$  and its longitude  $211^{\circ} 33' 42'' W.$

On the 4th, at noon, CAPE GLOUCESTER bore S.  $63^{\circ}$  E. and was distant  $7\frac{1}{2}$  leagues. The observed latitude was  $19^{\circ} 47' 30'' S.$  and the longitude, by the chart,  $212^{\circ} 10' W.$  which being increased by  $5' 49''$ , the error of the chart in this place, gives  $212^{\circ} 15' 49'' W.$  for the true longitude of the ship, at noon. Hence, the latitude of Cape Gloucester will be found  $19^{\circ} 57' 43'' S.$  and its longitude  $211^{\circ} 54' 30'' W.$

HOLBOURN ISLE lies N. by W.  $\frac{1}{2}$  W. from Cape Gloucester, and is 5 or 6 leagues from it.

On the 6th, at noon, CAPE CLEVELAND bore S.  $\frac{1}{2}$  E. and MAGNETICAL ISLAND S. W. by S.  $\frac{1}{2}$  west; each of them being about 2 leagues distant: consequently, Cape Cleveland was  $5^{\circ} 58''$  to the southward, and  $0^{\circ} 37''$  in longitude to the eastward of the situation of the ship; and Magnetical Island was  $4^{\circ} 38''$  south, and  $4^{\circ} 0''$  in longitude, west of it. The latitude of the ship was  $18^{\circ} 59\frac{1}{2}'$  S. by observation, and its longitude, by the chart,  $213^{\circ} 18'$  west, or  $213^{\circ} 24' 57''$  true. Hence, the latitude of Cape Cleveland is  $20^{\circ} 5' 28''$  S. and its longitude  $213^{\circ} 24' 20''$  west; and the latitude of Magnetical Island is  $20^{\circ} 4' 8''$  S. and its longitude  $213^{\circ} 28' 57''$  W.

June the 8th, at noon, the latitude, by observation, was,  $17^{\circ} 59'$  south, and the longitude by the chart,  $213^{\circ} 58' 30''$  W. which, as the error of the chart is here  $6' 5''$  in defect, is  $214^{\circ} 4' 35''$  true. CAPE SANDWICH bore S. by E.  $\frac{1}{2}$  E. distant 19 miles, and DUNK ISLE due west, distant 2 miles. Hence, the latitudes of these two places are,  $18^{\circ} 17' 11''$  S. and  $17^{\circ} 59'$  south; and their longitudes are  $213^{\circ} 58' 47''$  W. and  $214^{\circ} 6' 41''$  W.

On the 9th, at noon, they were a-breast of CAPE GRAFTON, which bore west, and they were about a mile from it. The latitude observed was  $16^{\circ} 53\frac{1}{2}'$  S. which, of course, is the latitude of Cape Grafton; and the longitude, by the chart, was  $214^{\circ} 11' 30''$  W. which as the error is here  $4' 40''$  in defect, is  $214^{\circ} 16' 10''$  true; consequently, the longitude of Cape Grafton is  $214^{\circ} 17\frac{1}{4}'$  W.

From this place to ENDEAVOUR RIVER the journals afford no data by which the situation of any point of land can be determined better than by the chart, and allowing the proper error. They had, indeed, something else to attend to, for on the 11th, in the evening, the ship ran a-ground on a ledge of Coral Rocks, and lay there until the following evening; and when they got her off, they found her so much damaged that it was with the utmost difficulty and fatigue they got her into that place, where they lay her a-ground and repaired her in the best manner they were able. They lay in Endeavour River, from  
the

the 17th of June to the 4th of August; and during that interval, many observations were made for determining the situation of the place: but, owing to Mr. Green's bad health at that time, not under all the advantages which might have been taken, I shall, however, make the most of them to the best of my judgment.

For the LATITUDE.

|                             |                   |           |       |           |          |        |
|-----------------------------|-------------------|-----------|-------|-----------|----------|--------|
| June 20th.                  | Meridian Altitude | ☉'s L. L. | 50 54 | Latitude, | 15 27 15 | South. |
| 22d.                        | Meridian Altitude | ☉'s L. L. | 50 55 | Latitude, | 15 26 30 |        |
| 24th.                       | Meridian Altitude | ☉'s L. L. | 50 54 | Latitude, | 15 27 12 |        |
| 26th.                       | Meridian Altitude | ☉'s L. L. | 50 57 | Latitude, | 15 27 00 |        |
| 28th.                       | Meridian Altitude | ☉'s L. L. | 51 2  | Latitude, | 15 27 30 |        |
| July 1st.                   | Meridian Altitude | ☉'s L. L. | 51 13 | Latitude, | 15 27 40 |        |
|                             |                   |           |       | <hr/>     |          |        |
| Latitude of Endeavour River |                   |           |       | - - - -   | 15 27 11 | South. |

For the LONGITUDE.

The first Satellite of Jupiter was observed to emerge at Greenwich on the 13th of July, at 9<sup>h</sup> 5' 7", and on the 5th of August, at 9<sup>h</sup> 19' 41" apparent time, with the six-feet reflector. Dr. Maskelyne has found by experience, that the emerfions of this satellite are seen about 20" sooner with the six-feet reflector than they are with the two-feet ones, which, Mr. Green and Captain Cook used: therefore, those two emerfions would have happened at 9<sup>h</sup> 5' 27", and 9<sup>h</sup> 20' 1" apparent time, respectively, if they had been observed with such a telescope as they made use of. These two emerfions are put down in the Nautical Almanac at 9 5' 9" and 9<sup>h</sup> 19' 41" apparent time; from which it appears, that the eclipses of Jupiter's first satellite are put down sooner by 18 or 20 seconds in the Nautical Almanac about that time, than they could be seen with a two-feet reflecting telescope. I have not made any use of the emerfion of the first satellite which was observed at Greenwich on the 11th of June, because Jupiter had not passed his opposition to the sun quite 36 hours when the observation was made, which seems to have affected it very materially. Having determined the errors of the numbers in the Nautical Almanac, about the time when the observations were made at Endeavour River, the longitude of that place may be determined from them as follows:

N n

Time



|  |            |                        |              |
|--|------------|------------------------|--------------|
| Time of emerfion in the Nautical Almanac         | June 29th, | 5 17 25                |              |
| Add for the error of computation                 | —          | —                      | 19           |
| Apparent time of the emerfion at Greenwich       | June 29th, | 5 17 44                |              |
| Time obferved by Mr. Green at Endeavour River    | June 28th, | 14 58 49               |              |
| Longitude of Endeavour River, weft               | —          | 14 18 55               |              |
| Apparent time of emerfion at Greenwich           | June 29th, | 5 17 44                |              |
| Time obferved by Capt. Cook at Endeavour River   | June 28th, | 14 59 18               |              |
| Longitude of Endeavour River, weft               | —          | 14 18 26               |              |
| Time of emerfion in the Nautical Almanac         | July 16th, | 22 2 22                |              |
| Add for the error of computation                 | —          | —                      | 19           |
| Apparent time of the emerfion at Greenwich       | July 16th, | 22 2 41                |              |
| Time obferved by Mr. Green at Endeavour River    | July 16th, | 7 39 51                |              |
| Longitude of Endeavour River, weft               | —          | 14 22 50               |              |
| Apparent time of the Emerfion at Greenwich       | July 16th, | 22 2 41                |              |
| Time obferved by Captain Cook at Endeavour River | —          | 7 41 31                |              |
| Longitude of Endeavour River, weft               | —          | 14 21 10               |              |
| The mean of the four is                          | —          | 14 20 20 $\frac{1}{4}$ | = 215 5 4 W. |
| The lunar obfervations (fee page 129) gave       | —          | —                      | 214 34 56 W. |
| The mean of the two means is                     | —          | —                      | 214 50 00 W. |
| By the chart it is                               | —          | —                      | 214 52 30 W. |
| Error of the chart at Endeavour River, too much  | —          | —                      | 2 30         |

On the 6th, at noon, the obferved latitude of the fhip was  $15^{\circ} 17' \frac{1}{2}$  S. and the longitude, by the chart,  $214^{\circ} 33'$  weft, which, allowing the error,  $3' 30''$  in excefs, is  $214^{\circ} 29' 30''$  W. At this time CAPE BEDFORD bore W.N.W. $\frac{1}{2}$ W. and was diftant 5 leagues. Cape Bedford, therefore, lies in  $15^{\circ} 13' 9''$  S. latitude, and  $214^{\circ} 44' 21''$  W. longitude. On the 8th, at noon, the obferved latitude was  $15^{\circ} 10'$  S. and the longitude, by the chart,  $214^{\circ} 36'$  weft, or  $214^{\circ} 31' 30''$  corrected. At this time, Cape Bedford bore W.S.W. and was diftant 3 leagues and a half, which places the Cape in  $15^{\circ} 14'$  S. latitude, and  $214^{\circ} 41' 35''$  W. longitude. The mean of the two determinations, is  $15^{\circ} 13' 35''$  S. and  $214^{\circ} 43'$  W.

CAPE

CAPE FLATTERY bore S. S. W. and was distant 2 leagues on the 10th, at noon, when the observed latitude was  $14^{\circ} 51' 30''$  S. and the longitude, by the chart,  $214^{\circ} 42'$  west, which is  $214^{\circ} 36' 30''$  west true. Hence, the latitude of Cape Flattery is  $14^{\circ} 57' 3''$  S. and its longitude,  $214^{\circ} 38' 54''$  W.

From this time to the 21st, at noon, the journals afford no assistance for determining the situations of the land better than the chart will do it, when the proper error is allowed: but that day, the observed latitude was  $10^{\circ} 38' 15''$  S. and the longitude, by the chart,  $218^{\circ} 18'$  W. which, as the error here is  $34' 19''$  in excess, is  $217^{\circ} 43' 41''$  west true. At this time, YORK CAPE, or the most northerly point of New Holland, bore S.  $88^{\circ}$  W. and was distant 3 or 4 miles: consequently, York Cape is in latitude  $10^{\circ} 38' 20''$  S. and longitude  $217^{\circ} 47' 40''$  W.

After Captain Cook passed York Cape, he took up his numerical reckoning again, supposing that point to be situated as he has placed it on the chart; so that he set out with the error of that point in his reckoning, let it be what it will. The following table, exhibits the ship's place every day at noon, from her quitting the chart to her arrival in the Straits of Sunda, both according to the Captain's reckoning; and according to that reckoning after it has been corrected by the numbers which stand in the fourth column: these numbers being derived in the usual manner, except that the error on the 1st of October, was determined from the bearings and distances of Cracatoa and Prince's Island, that day at noon, and the known longitudes of these places.

## DEDUCTIONS FROM THE

| 1770.      | Latitude of<br>the Ship<br>South. | Longit. by<br>Account.<br>West. | Error of<br>Account. | Corrected<br>Longitude.<br>West. | Remarks.  |
|------------|-----------------------------------|---------------------------------|----------------------|----------------------------------|---|
| h Aug. 25. | 10. 18                            | 219. 39                         | 30                   | 219. 9                           | { The Island of St. Bartolomeo N. 74° E.<br>distant 20 miles.   |
| o — 26.    | 10. 10 $\frac{2}{3}$              | 220. 12                         | — 28                 | 219. 44                          |   |
| D — 27.    | 9. 56                             | 221. 0                          | — 27                 | 220. 33                          |   |
| o — 28.    | 8. 51 $\frac{2}{3}$               | 221. 27                         | — 26                 | 221. 1                           |   |
| o — 29.    | 8. 18 $\frac{1}{2}$               | 221. 44                         | — 25                 | 221. 19                          |   |
| h — 30.    | 8. 37                             | 222. 34                         | — 24                 | 222. 10                          | { The ship 10 miles north of the log.   |
| o — 31.    | 8. 11 $\frac{2}{3}$               |                                 | — 23                 |                                  |   |
| h Sept. 1. | 7. 39                             | 222. 42                         | — 22                 | 222. 20                          | { Saw land, which they supposed was the<br>Arrou Islands.   |
| o — 2.     | 7. 14                             | 222. 30                         | — 20                 | 222. 10                          |   |
| D — 3.     | 6. 15 $\frac{1}{2}$               |                                 | — 19                 |                                  |   |
| o — 4.     | 6. 43 $\frac{3}{4}$               | 223. 51                         | — 18                 | 223. 33                          |   |
| o — 5.     | 7. 23 $\frac{1}{4}$               | 225. 41                         | — 17                 | 225. 24                          |   |
| h — 6.     | 8. 14 $\frac{7}{8}$               | 227. 47                         | — 16                 | 227. 31                          | { The ship 6' south of the log.<br>The ship 10' south of the log.<br>The ship 15' south of the log.   |
| o — 7.     | 9. 35 $\frac{1}{2}$               | 229. 34                         | — 16                 | 229. 18                          |   |
| h — 8.     | 9. 35 $\frac{1}{8}$               | 231. 17                         | — 15                 | 231. 2                           |   |
| o — 9.     | 9. 43                             | 232. 7                          | — 14                 | 231. 53                          |   |
| D — 10.    | 10. 0                             | 233. 27                         | — 13                 | 233. 14                          |   |
| o — 11.    | 9. 35 $\frac{3}{4}$               | 233. 54                         | — 12                 | 233. 42                          | { South end of Timor S. W. by W. dif-<br>tant 3 leagues<br>South end of Timor N. N. W. distant<br>5 or 6 leagues<br>Savu, S. W. by S. distant from the<br>shore 1 mile. |
| o — 12.    | 9. 35 $\frac{1}{2}$               | 234. 12                         | — 11                 | 234. 1                           |   |
| h — 13.    | 9. 45                             | 234. 12                         | — 10 $\frac{1}{2}$   | 234. 1 $\frac{1}{2}$             |   |
| o — 14.    | 9. 54 $\frac{1}{2}$               |                                 | — 10                 |                                  |   |
| h — 15.    | 10. 1                             |                                 | — 9                  |                                  |   |
| o — 16.    | 10. 23                            | 235. 57                         | — 8                  | 235. 49                          | { At anchor in Seba Bay, in the Island of<br>Savu.  |
| D — 17.    | 10. 27                            | 237. 31                         | — 7                  | 237. 24                          |   |
| o — 18.    |                                   |                                 |                      |                                  |   |
| o — 19.    |                                   |                                 |                      |                                  |   |
| h — 20.    |                                   |                                 |                      |                                  |   |
| o — 21.    | 10. 33                            |                                 | — 6                  |                                  | { The ship 25' north of the log.  |
| h — 22.    | 10. 9                             | 238. 56                         | — 5 $\frac{1}{2}$    | 238. 50 $\frac{1}{2}$            |   |
| o — 23.    | 11. 10                            | 240. 38                         | — 5                  | 240. 33                          |   |
| D — 24.    | 11. 5 $\frac{1}{2}$               | 242. 23                         | — 4                  | 242. 19                          |   |
| o — 25.    | 11. 12 $\frac{1}{2}$              | 244. 30                         | — 3                  | 244. 27                          |   |
| o — 26.    | 11. 10                            | 246. 31                         | — 2                  | 246. 29                          | { The Island of Cracatoa, N. 40° E. distant<br>7 leagues, and Prince's Island, S. 21<br>E. distant 3 leagues.   |
| h — 27.    | 10. 46                            | 249. 52                         | — 1                  | 249. 51                          |   |
| o — 28.    | 10. 50                            | 252. 11                         | — 0 $\frac{1}{2}$    | 252. 10 $\frac{1}{2}$            |   |
| h — 29.    | 9. 31                             | 254. 10                         | 0                    | 254. 10                          |   |
| o — 30.    | 7. 34                             | 255. 13                         | + 1                  | 255. 14                          |   |
| D Oct. 1.  | 6. 29                             | 254. 44                         | + 2                  | 254. 46                          |   |

On the 29th of August, at noon, the Island of St. Bartolomeo, on the coast of New Guinea, bore N.  $74^{\circ}$  E. and was distant 20 miles, consequently, the true latitude and longitude of the ship, as appears from the table, being  $8^{\circ} 18' 20''$  S. and  $221^{\circ} 19'$  W. respectively, the latitude of that island will be  $8^{\circ} 12' 50''$  S. and its longitude  $221^{\circ} 0'$  W.

On the 30th of August, at noon, the latitude of the ship was observed to be  $8^{\circ} 37'$  south; and its longitude, as appears from the table, was  $222^{\circ} 10'$  W. From this time they ran N.  $66^{\circ}$  W. 4 miles, and N.  $88^{\circ}$  W.  $21\frac{1}{2}$  miles to 6 o'clock in the evening, when POINT ST. AUGUSTINE, or WALSCHE CAPE bore due north, and was distant about 4 leagues. Hence, the latitude of this point of land is  $8^{\circ} 23'$  S. and its longitude  $222^{\circ} 35'$  W.

It is necessary to remark here, that the bearing of Cape Walsche, which is put down with the observations of the 29th of August, 1770, (see p. 57) is copied literally from Mr. Green's memorandum-book, in which the observations appear to have been written down at the time they were taken. The preceding bearings of that point are taken from Captain Cook's journal: both cannot be right, because they are on different days. I am rather inclined to think that Mr. Green mistook some other point for Cape Walsche, and that Captain Cook is right; because, if Mr. Green had been right, Captain Cook could not have seen any part of the land the next day in the position which he did.

I must take this opportunity of observing, likewise, that the meridional altitudes of the sun's lower limb, which are put down to the 3d and 4th of September, 1770, on the same page, are copied from Mr. Green's book; but I now find it pretty certain that they are each of them a degree too little; in consequence of which, the latitudes of these days are a degree too great. The latitudes ought undoubtedly to be  $6^{\circ} 15'\frac{1}{2}$  S. and  $6^{\circ} 43'\frac{1}{4}$  S. as Captain Cook has them, and as they stand in the foregoing table.

At 5 o'clock on the 5th of September, in the morning, land, which they took to be one of the ARROU Islands, bore due north, and was distant 2 or 3 leagues. From this time to noon, they ran S.  $70^{\circ}$  W.  $35^{\circ} \frac{1}{2}$  miles, when they were in latitude  $7^{\circ} 23' \frac{1}{4}$  S. and longitude  $225^{\circ} 24'$  W. Hence, this land will be found to lie in the latitude of  $7^{\circ} 3' \frac{1}{2}$  S. and longitude  $224^{\circ} 51'$  W.

At noon, on the 6th, they saw land, which bore from north to west, and was distant 5 or 6 leagues. From hence the middle of this land bore north west, and was 12 miles to the north of the ship, and as many in longitude west of it; consequently, as the latitude of the ship was then  $8^{\circ} 15'$  south, and its longitude  $227^{\circ} 31'$  west, the latitude of this land must be  $8^{\circ} 3'$  south, and its longitude  $227^{\circ} 43'$  west. Captain Cook entertained no doubt of this being the island called TIMOR LAUT.

On the 15th, at noon, the south end of TIMOR bore S. W. by W. and was distant 3 leagues. The latitude of the ship was then  $10^{\circ} 1'$  S.: consequently, the latitude of the south end of Timor is  $10^{\circ} 6'$  S. On the 16th, at noon, the latitude of the ship was  $10^{\circ} 23'$  south, and its longitude  $235^{\circ} 49'$  W. The south end of Timor bore N. N. W. and was distant 5 or 6 leagues: hence, the latitude of the south end of Timor is  $10^{\circ} 7' \frac{1}{4}$  south, and its longitude  $235^{\circ} 55' 24''$  W. The mean of the two latitudes is  $10^{\circ} 6' 52''$  S.

On the 17th, at noon, the island of SAVU bore S. W. by S. and they were about a mile from the shore. The ship was then in  $10^{\circ} 27'$  south latitude, and  $237^{\circ} 24'$  west longitude: consequently, the N. E. side of this island is in  $10^{\circ} 28'$  S. latitude, and longitude  $237^{\circ} 25'$  west of Greenwich.

From this time nothing material to my purpose occurred until the 1st of October; on which day, at noon, the island of CRACATOA bore N.  $40^{\circ}$  E. and the middle of PRINCES ISLAND S.  $21^{\circ}$  east, from which, the latitude of the ship, and the known situations of these

two

two islands\*, I infer, that the true longitude of the ship was  $254^{\circ} 46' W$ ; and, as Captain Cook's reckoning gave  $254^{\circ} 44'$  west; I conclude, that the error of his reckoning was then 2 minutes in defect. Captain Cook says, he allowed 20 miles each day during the passage from Savu to Java-Head for the effects of a westerly current, which he supposed runs very strong at this time of the year, and found it to answer very well.

From this time to that of their arrival at BATAVIA, the journals afford no data to determine any thing from to the purpose; nor after they left that place until they took their departure from JAVA HEAD, on their return home, by the Cape of Good Hope; from which time I shall endeavour to investigate the rout they took as follows:

When the observations were made on the 6th of February, the longitude by account was  $85^{\circ} 56' 18'' E$ . and it was  $83^{\circ} 39' 24'' E$ . when the observations were made on the 7th: the mean results of the observations of these two days are  $83^{\circ} 57' E$ . and  $81^{\circ} 28' 19'' E$ . the errors of the reckoning appear, therefore, to be  $1^{\circ} 59' 18''$ , and  $2^{\circ} 11' 5''$  in excess; and the mean of them is  $2^{\circ} 5' 12''$  in excess. The moon was now west of the sun.

On the 20th, 21st, 22d, 23d, and 24th, the moon was east of the sun; and the longitude by account, when the observations of these days were made, were  $59^{\circ} 32' 36''$  east,  $57^{\circ} 8' 30''$  east,  $54^{\circ} 49' 18''$  east,  $52^{\circ} 48' 30''$  east, and  $50^{\circ} 40' 18''$  east. The mean results of the observations are  $55^{\circ} 27' 15''$  east,  $53^{\circ} 3' 8''$  east,  $50^{\circ} 25' 10''$  east,  $47^{\circ} 54' 55''$  east, and  $45^{\circ} 8' 30''$  east: consequently, the errors of the reckoning will be  $4^{\circ} 5' 31''$ ,  $4^{\circ} 5' 22''$ ,  $4^{\circ} 24' 8''$ ,  $4^{\circ} 53' 35''$  and  $5^{\circ} 33' 48''$  in excess; of which the mean is  $4^{\circ} 36' 20''$  in excess, and the mean of this and  $2^{\circ} 5' 12''$ , the error when the moon was west of the sun, is  $3^{\circ} 20' 46''$  in excess; and which I suppose was the error of the reckoning on the 14th of February, when the new-moon happened.

\* I suppose Cracatoa to be in latitude  $6^{\circ} 6'$  south, and longitude  $254^{\circ} 24'$  west, and Princes Island to be in latitude  $6^{\circ} 36' \frac{1}{4}$  south, and longitude  $205^{\circ} 44 \frac{3}{4}$  west.

The moon was again west of the sun when the observations were made on the 7th, 8th, and 10th of March; and the mean results of these observations are  $27^{\circ} 31' 0''$  east,  $28^{\circ} 0' 35''$  east, and  $28^{\circ} 25' 50''$  E. on the 7th,  $24^{\circ} 11' 5''$  E. on the 8th, and  $21^{\circ} 30' 20''$  E. on the 10th. The longitudes of the ship, according to Captain Cook's reckoning, at these times, were  $38^{\circ} 3' 42''$  east,  $37^{\circ} 57' 15''$  east,  $37^{\circ} 55' 30''$  east,  $35^{\circ} 24' 24''$  east, and  $33^{\circ} 49' 48''$  east: consequently, the several errors appear to be  $10^{\circ} 32' 42''$ ,  $9^{\circ} 57' 12''$ ,  $9^{\circ} 29' 40''$ ,  $11^{\circ} 13' 19''$ , and  $12^{\circ} 19' 28''$  in excess. The mean of the whole is  $10^{\circ} 42' 28''$  in excess; and the mean of this and  $4^{\circ} 36' 20''$ , the apparent error when the moon was east of the sun, is  $7^{\circ} 39' 24''$  in excess, which must have been the error of the reckoning, on the 1st of March, at noon, when the moon was at the full.

On the 13th of March, at noon, the longitude of the ship, by account, was  $31^{\circ} 16'$  E. and the Cape of Good Hope bore S. E. and was distant 4 leagues: hence, the longitude of the Cape was  $31^{\circ} 26' 18''$  east, according to the reckoning: but the true longitude of the Cape is known to be  $18^{\circ} 23' 15''$  east; consequently, the error of the reckoning was now  $13^{\circ} 3' 3''$  in excess. From these data, I have constructed the following table, which exhibits the place of the ship every day at noon, during her passage from Java Head to the Cape of Good Hope, by Captain Cook's reckoning; the error of his reckoning according to the observations, and the place of the ship corrected by that error.

# ASTRONOMICAL OBSERVATIONS.

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| 1771.    | Latitude<br>of the<br>Ship. S. | Longit. of<br>the Ship by<br>Account.<br>East. | Error of the<br>Reckoning. | True<br>Longitude<br>of the<br>Ship. East. | Remarks.                                       |
|----------|--------------------------------|--|----------------------------|--|--|
|          | ° /                            | ° /  | ° /                        | ° /  |  |
| Jan. 16. | 6.45                           | 104.43   | — 0.0                      | 104.43                                     | Java Head S. E. by S. dist. 2 leagues.         |
| 17.      | 7.32                           | 104.25   | — 0.3                      | 104.22                                     |  |
| 18.      | 7.55                           | 104.6  | — 0.6                      | 104.0                                      |  |
| 19.      | 8.48                           | 104.9  | — 0.10                     | 103.59                                     |  |
| 20.      | 9.14                           | 103.45   | — 0.14                     | 103.51                                     |  |
| 21.      | 9.46                           | 102.55   | — 0.18                     | 102.37                                     |  |
| 22.      | 9.29                           | 102.52   | — 0.24                     | 102.28                                     |  |
| 23.      | 9.30                           | 103.10   | — 0.30                     | 102.40                                     |  |
| 24.      | 9.34                           | 103.10   | — 0.36                     | 102.34                                     |  |
| 25.      | 9.41                           | 103.16   | — 0.42                     | 102.34                                     |  |
| 26.      | 9.56                           | 103.28   | — 0.48                     | 102.40                                     |  |
| 27.      | 10.12                          | 103.19   | — 0.54                     | 102.25                                     |  |
| 28.      | 11.0                           | 101.33   | — 1.0                      | 101.33                                     |  |
| 29.      | 11.57                          | 101.45   | — 1.6                      | 100.39                                     |  |
| 30.      | 12.48                          | 101.1  | — 1.12                     | 99.49                                      |  |
| 31.      | 13.42                          | 100.5  | — 1.18                     | 98.47                                      |  |
| Feb. 1.  | 14.44                          | 98.20  | — 1.24                     | 96.56                                      |  |
| 2.       | 15.48                          | 95.44  | — 1.30                     | 94.14                                      |  |
| 3.       | 16.40                          | 93.44  | — 1.36                     | 92.8                                       |  |
| 4.       | 17.30                          | 91.28  | — 1.42                     | 89.46                                      |  |
| 5.       | 18.6                           | 89.6   | — 1.48                     | 87.18                                      |  |
| 6.       | 18.30                          | 87.32  | — 1.54                     | 85.38                                      |  |
| 7.       | 18.58                          | 85.40  | — 2.0                      | 83.40                                      |  |
| 8.       | 19.24                          | 83.20  | — 2.8                      | 81.12                                      |  |
| 9.       | 19.58                          |  | — 2.18                     |  |  |
| 10.      | 20.28                          | 80.58  | — 2.29                     | 78.29                                      |  |
| 11.      | 20.58                          | 78.48  | — 2.42                     | 76.6                                       |  |
| 12.      | 21.25                          | 77.24  | — 2.54                     | 74.30                                      |  |
| 13.      | 21.51                          | 75.55  | — 3.7                      | 72.48                                      |  |
| 14.      | 22.21                          | 74.7   | — 3.21                     | 70.46                                      |  |
| 15.      | 22.40                          | 71.55  | — 3.35                     | 68.20                                      |  |
| 16.      | 22.52                          | 69.50  | — 3.49                     | 66.1                                       |  |
| 17.      | 23.20                          | 67.2   | — 4.6                      | 62.56                                      |  |
| 18.      | 23.57                          | 64.24  | — 4.23                     | 60.1                                       |  |
| 19.      | 24.26                          | 62.5   | — 4.39                     | 57.26                                      |  |
| 20.      | 24.57                          | 59.49  | — 4.56                     | 54.53                                      |  |
| 21.      | 25.21                          | 57.31  | — 5.13                     | 52.18                                      |  |
| 22.      | 26.5                           | 55.11  | — 5.30                     | 49.41                                      |  |
| 23.      | 26.59                          | 53.4   | — 5.47                     | 47.17                                      | Ship south of the Account,<br>Ditto.<br>Ditto. |
| 24.      | 27.45                          | 51.3   | — 6.4                      | 44.59                                      |  |
| 25.      | 28.49                          | 49.4   | — 6.21                     | 42.43                                      |  |
| 26.      | 29.6                           | 46.46  | — 6.39                     | 40.7                                       |  |
| 27.      | 29.30                          | 44.45  | — 6.58                     | 37.47                                      |  |
| 28.      | 29.37                          | 43.5   | — 7.18                     | 35.47                                      |  |
| March 1. | 29.41                          | 41.44  | — 7.39                     | 34.5                                       |  |
| 2.       | 30.21                          | 40.24  | — 8.2                      | 32.22                                      |  |
| 3.       | 31.1                           | 39.8   | — 8.26                     | 30.42                                      |  |
| 4.       | 31.34                          | 37.34  | — 8.52                     | 28.42                                      |  |
| 5.       | 31.52                          | 37.14  | — 9.20                     | 27.54                                      | Ship 90 miles S. of Account in 2 Days          |
| 6.       | 32.4                           | 38.34  | — 9.48                     | 28.46                                      |  |



| 1771.       | Latitude<br>of the<br>Ship S. | Longit. of<br>the Ship by<br>Account.<br>East. | Error of the<br>Reckoning. | True<br>Longitude<br>of the<br>Ship. East. | Remarks.                                |
|-------------|-------------------------------|--|----------------------------|--|---|
|             | ° /                           | ° /  | ° /                        | ° "  |   |
| 24 March 7. | 32. 54                        | 38. 16   | — 10. 16                   | 28. 0                                      |   |
| ♀ — 8.      | 34. 18                        | 37. 47   | — 10. 45                   | 27. 2                                      | Ship 93 miles S. of Acct. in 2 Days.    |
| h — 9.      | 35. 44                        | 35. 17   | — 11. 15                   | 24. 2                                      | Ship 46 miles S. of Account.            |
| ⊙ — 10.     | 34. 52                        | 34. 58   | — 11. 45                   | 23. 13                                     | Ship 14 miles N. of Account.            |
| ☽ — 11.     | 34. 45                        | 33. 35   | — 12. 15                   | 21. 20                                     | Land due North, dist. 5 leagues.        |
| ♂ — 12.     | 34. 58                        | 32. 52   | — 12. 41                   | 20. 11                                     | Cape La Aguilhas N. E. by N. 4 lea.     |
| ♀ — 13.     | 34. 15                        | 31. 16   | — 13. 3                    | 18. 13                                     | The Cape of Good Hope S.E. dist. 4 lea. |

I have been very particular in the construction of this table; because I wished to shew the strength, direction, and extent of the very extraordinary currents, by which the ship was affected, in its run from Java Head to the Cape of Good Hope, in the fullest and most exact manner that my materials would admit of. In order to this, I have not contented myself with allowing a proportional part of the variation in the error between each semi-lunation to have happened each day; but have augmented or diminished the daily allowance, in the proportion which the increasing or decreasing velocity of the current seems to require. The observations appear to me, to have been very well made; and I have no doubt, but that the table exhibits the true place of the ship, in longitude, each day at noon, notwithstanding the prodigious force of the current, within less than half a degree.

They made the land of Africa on the 5th of March, at 5 o'clock in the morning, and at noon it bore from N. E. by N. to W. S. W. and was distant about 4 leagues. The latitude of the ship was then, according to the table,  $31^{\circ} 52'$  south, and its longitude  $27^{\circ} 54'$  E.; so that this part of the coast of Africa is in latitude  $31^{\circ} 43'$  south, and longitude  $27^{\circ} 45'$  east; but the violence of the current renders it impossible to determine any thing of this nature with precision, and therefore I shall not attempt any thing farther.

T H E E N D.

